The World's WARSHIPS

Raymond V. B. BLACKMAN M.I.Mar.E., M.R.I.N.A.

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Editor of
Jane's Fighting Ships

3rd edition

completely revised, with many additions

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(Editor of **Jane's Fighting Ships**)

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Third and completely revised edition

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INTRODUCTION

THIS third edition of *The World's Warships* brings up to date the book first published in 1955 which was very well received and by popular demand necessitated a second edition in 1960. The new volume, it is hoped, will satisfy the keen interest not only of students of naval affairs, but also those who, though possessed of more technical knowledge, have not to hand the much fuller standard naval reference work, *Jane's Fighting Ships*.

This book does not pretend to constitute an exhaustive survey of every naval vessel in the world right down to small escort vessels, minesweepers, patrol boats, landing ships, auxiliaries, service craft and ancillary vessels—such a task would be beyond the compass of these pages with their full descriptive, statistical and tabulated treatment—but it does include all the modern and major warships extant of the principal maritime powers.

The arrangement of ships is not alphabetical by country, but categorical, in descending order for easy reference and comparison. All the aircraft carriers, commando carriers, guided missile ships and cruisers in the world, and all modern destroyers, frigates, destroyer escorts, and submarines are fully described with technical and building data, but old and small warships of lesser countries have been omitted, partly for reasons of space and because it was felt that readers would prefer a comprehensive summary of the qualities of modern fighting ships to a sketchy mention of all naval vessels, however unimportant or unseaworthy, of all countries.

Massive battle fleets with great cruiser squadrons scouting ahead and flanked by protective screens of destroyers circulating in their predetermined orbits or localised spheres of influence, now belong to the past. In the modern concept, allowing much more flexible strategy and tactics, task forces are formed and sent out to operate in any part of the world. These task forces consist of any strength and combination of the aircraft carriers, cruisers, destroyers, anti-submarine frigates, and submarines described in this book.

In a future war fought with the newest weapons of mass destruction the rôle for navies remains clear; their functions are: to search out and destroy enemy ships wherever they are, and by all means within their power to prevent the enemy from using the seas for his own purposes; to protect the communications necessary to support any warlike operations and to safeguard the supply lines of the engaged countries; to provide direct air support for operations ashore and afloat in those areas where it cannot readily be given by shore-based aircraft. In war two outstanding qualities of sea power are vividly evident, namely mobility and relative independence of land bases. In peace naval power plays a prominent part in supporting national policy overseas and in ensuring that world-wide trade continues unmolested. The latest inventions affect naval warfare by altering the character of forces needed, but do not diminish the need for navies. In emergency aircraft carriers and other warships can be brought to bear quickly and effectively in any part of the world.

Battleships are now almost extinct. They have disappeared from the Russian, French, Italian, Argentine, Brazilian and Chilean navies, while the United States Navy retains 4 battleships, although all have been withdrawn from active service. And conventional cruisers are following battleships into obsolescence in every country except two. In the United States Navy some cruisers are used as flagships and others have been converted into guided-missile ships. Only Russia built a large number of conventional cruisers after the Second World War.

But naval architects and maritime experts are becoming increasingly aware of the revolution in naval strategy and global sea warfare caused by the introduction of guided-missile ships and nuclear-powered submarines. With their increase in size, propulsive power, range and destructive capacity, submarines are now regarded by the principal naval powers as major warships.

RAYMOND V. B. BLACKMAN.

Portsmouth, 1963.

CONTENTS

AIRCRAFT CARRIERS

THE forerunner was the *Ark Royal*, an oil tanker purchased while under construction in 1914 and converted into a seaplane carrier. The germ of the modern aircraft carrier was in the first ship adapted as such in 1915–16, the Cunard liner *Campania* of 20,570 tons with a speed of 22 knots. The aircraft carrier proper was actually in embryo design in 1912, but it was not until 1916 that, to save time, the hull of the Italian liner *Conte Rosso*, begun in 1914, was acquired for conversion, and she was completed as the aircraft carrier *Argus* in 1918. She was the first ship fitted with a flush, full-length flight deck, furnace smoke being expelled through large horizontal ducts opening out either side aft. She had a displacement of 14,000 tons, a capacity of 20 aircraft and a speed of 20 knots. The *Furious*, designed as a battle cruiser displacing 19,100 tons to mount two 18-inch guns, was completed in 1917 with a flying-off deck forward. Later a flying-on deck was added abaft the funnel. Extensively reconstructed between the wars, a new hangar was built forward, a continuous flush flight deck provided, and mast and funnel removed, smoke being discharged from vents aft. In 1939 the starboard island superstructure was added. Finally she displaced 22,450 tons with 33 aircraft and a speed of 31 knots. The *Eagle*, begun in 1913 as the Chilean battleship *Almirante Cochrane*, was purchased on the stocks in 1917 for conversion into an aircraft carrier. First completed in 1920 with a single funnel and pole mast, she finally emerged from extensive reconstruction in 1924 with two funnels and two masts and a full-length flight deck. She was the first aircraft carrier to have the now familiar island on the starboard beam. She displaced 22,600 tons, carried 21 aircraft, and steamed at 24 knots. The first aircraft carrier specially designed and actually laid down as such was the *Hermes*, completed in 1924. With a displacement of 10,850 tons, a capacity of 15 aircraft and a speed of 25 knots, she represented an attempt to produce a floating aerodrome of moderate size. The *Glorious* and *Courageous*, completed in 1917 as battle cruisers of 18,600 tons displacement carrying four 15-inch guns, were converted into aircraft carriers during 1924–30. They had a greater capacity of 48 aircraft, a speed of 31 knots,

and were well armed. Here at last were fast and capacious aircraft carriers. They eventually displaced 22,500 tons, and succeeding aircraft carriers closely conformed to their characteristics. The famous *Ark Royal*, completed in 1938, incorporated in her design all the improvements suggested by experience with her predecessors. She was the first large and fast aircraft carrier laid down as such, and she constituted such an advance on any previous aircraft carrier that she was the prototype of our existing aircraft carriers. She had a displacement of 22,000 tons, a capacity of 60 aircraft and a speed of 31 knots. Thereafter aircraft carriers, having been more or less standardised as a definite separate and highly specialised category of warships, were built in classes rather than as ships of individual design. The *Ark Royal* was succeeded by the basically similar aircraft carriers *Formidable*, *Illustrious*, *Victorious* (now rebuilt), *Indomitable*, *Implacable* and *Indefatigable* displacing 23,000 to 26,000 tons, completed in 1940–44, while the *Unicorn*, a maintenance carrier of 14,750 tons, was completed in 1943. These were followed by the aircraft carriers of the "Colossus" class of 13,190 to 13,350 tons completed in 1944–46, namely *Colossus* (now French *Arromanches*) *Glory*, *Ocean*, *Theseus*, *Triumph* (now heavy repair ship), *Venerable* (now Netherlands *Karel Doorman*), *Vengeance* (now Brazilian *Minas Gerais*) and *Warrior* (now Argentine *Independencia*), and the *Perseus* and *Pioneer* (completed as maintenance carriers of 12,265 tons). The six later aircraft carriers of the "Majestic" class displacing 15,700 to 16,000 tons, completed from 1948 onwards, were the *Hercules* (now Indian *Vikrant*), *Leviathan*, *Majestic* and *Terrible* (now Australian *Melbourne* and *Sydney*, respectively), *Magnificent* (formerly lent to Canada) and *Powerful* (now Canadian *Bonaventure*). Details of succeeding aircraft carriers are given in the following pages, but it is interesting to note that the saga which started with the *Ark Royal* of 1914 culminated with the *Ark Royal* of 43,340 tons displacement completed in 1955. Great Britain has five aircraft carriers, while the U.S.A. has 26 (excluding those declassified as assault ships, transports and ferrys). Most modern fleet aircraft carriers are fitted with the angled deck.

ARK ROYAL **EAGLE**

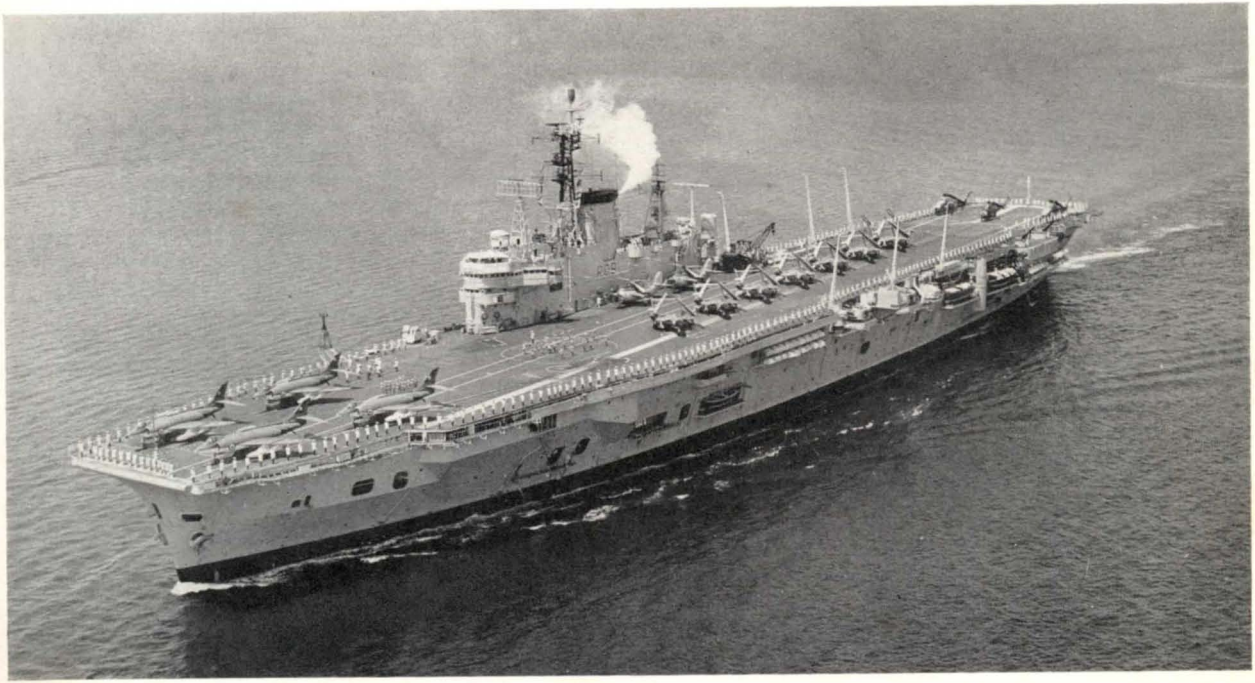
The largest aircraft carriers ever built for the Royal Navy. These two ships were to have been named *Irresistible* and *Audacious*, but they were launched as *Ark Royal* and *Eagle*, respectively, so perpetuating the names of the famous aircraft carriers lost in 1941 and 1942. Although begun as sister ships, the interval between dates of completion produced many differences in their design. *Ark Royal* was the first vessel to have a deck-edge lift (now removed) on the American pattern, steam catapults built in as opposed to fitted later, and an interim angled deck. The four 4.5-inch guns on the port side forward were removed to allow unimpeded flying off, and the four 4.5-inch guns on the starboard side forward were removed later. In 1959 *Eagle* was taken in hand at H.M. Dockyard, Devonport, for reconstruction, scheduled to be completed in 1964, providing a fully angled flight deck at $8\frac{1}{2}$ degrees, new flight deck armour, 984 radar, two steam catapults, sturdy lattice mainmast, larger island, and other structural alterations to complete her modernisation. Identification letters painted on flight deck and aircraft are *Ark Royal* R, *Eagle* E.

	Standard displacement	*Full load displacement*	*Length*	*Beam*	*Draught*
Ark Royal:	43,340 tons	53,340 tons	$808\frac{2}{3}$ feet o.a.	$160\frac{1}{2}$ feet o.a.	36 feet
Eagle:	44,100 tons	54,100 tons	$803\frac{3}{4}$ feet o.a.	$166\frac{3}{4}$ feet o.a.	36 feet

	Main guns	*Anti-aircraft armament*	*Aircraft*	*Armour*
Ark Royal:	8–4.5 inch	32–40 mm. guns	42	Flight deck and side
Eagle:	8–4.5 inch	6 "Seacat" missile launchers	42	Flight deck and side

Propelling machinery	*Shaft horse power*	*Boilers*	*Speed*	*Complement*
Parsons geared turbines	152,000	8 Admiralty 3-drum	31.5 knots	1,745 (ship) to 2,750 (with air squadrons)

Name	*Began*	*Launched*	*Completed*	*Builders*
ARK ROYAL	3 May 1943	3 May 1950	25 Feb. 1955	Cammell Laird & Co. Ltd., Birkenhead
EAGLE	24 Oct. 1942	19 Mar. 1946	1 Oct. 1951	Harland & Wolff Ltd., Belfast



ARK ROYAL

CENTAUR **HERMES**

These vessels were the logical development of the original "Colossus" and "Majestic" classes of light fleet aircraft carriers, being designed for a speed enabling them to operate with a modern task force. Propelling machinery of nearly twice the power gave them the necessary few knots increase in speed. This class was the first to be provided with the new angled deck, fitted in *Centaur* after her completion. *Hermes* was so different from her sisters as to be a new type entirely. She incorporated five post-war developments: the angled deck (6½ degrees off the centre-line of the ship), steam catapults, mirror deck-landing sights, 3-D radar, and the deck-edge lift. *Centaur* has been modernised and equipped with steam catapults instead of her former hydraulic catapults. She has a 5½ degrees angled deck. Deck recognition letters are C and H respectively. Sister ships *Albion* and *Bulwark* were converted into commando ships, see later page.

	Standard displacement	*Full load displacement*	*Length*	*Beam*	*Draught*
Centaur:	22,000 tons	27,000 tons	737¾ feet o.a.	123 feet o.a.	27 feet
Hermes:	23,000 tons	27,800 tons	744¼ feet o.a.	144½ feet o.a.	28 feet

	Anti-aircraft guns	*Aircraft*	*Catapults*	*Armour*	*Complement*
Centaur:	20–40 mm.	21	2 steam	Flight deck	1,028 (ship) to 1,390 (with air squadrons)
Hermes:	10–40 mm.	21	2 steam	Flight deck	1,834 (ship) to 2,100 (with air squadrons)

Propelling machinery	*Shaft horse power*	*Boilers*	*Speed*
Parsons geared turbines	78,000	4 Admiralty 3-drum	28 knots

Name	*Began*	*Launched*	*Completed*	*Builders*
CENTAUR	30 May 1944	22 April 1947	1 Sept. 1953	Harland & Wolff Ltd., Belfast
HERMES	21 June 1944	16 Feb. 1953	18 Nov. 1959	Vickers-Armstrongs Ltd., Barrow-in-Furness

HERMES

VICTORIOUS

The sole survivor of a series of six fleet aircraft carriers completed in 1940–44, her sister ships *Formidable*, *Illustrious*, *Indomitable*, *Implacable* and *Indefatigable* having been scrapped in 1953–57. The *Victorious* was virtually rebuilt and completely modernised in H.M. Dockyard, Portsmouth during 1950–58. She was the first aircraft carrier in the Royal Navy to be provided with a fully angled deck. She was also equipped with steam catapults, the most modern landing control system, and the latest arrester gear. Her electronic equipment was of the most advanced design, and she was one of the best equipped aircraft carriers in the world. Her modernisation included the mounting of new armament, the provision of a massive and high-powered radar set, the installation of new boilers, and improved accommodation. Deck Recognition letter, V

Standard displacement	*Full load displacement*	*Length*	*Beam*	*Draught*
30,530 tons	35,500 tons	781 feet o.a.	103⅛ feet w.l. 157 feet o.a.	31 feet

Main guns	*Anti-aircraft guns*	*Aircraft*	*Armour*	*Complement*
12–3 inch	6–40 mm.	35	4½ inch side 3½ inch deck	2,200

Propelling machinery	*Shaft horse power*	*Boilers*	*Speed*
Parsons geared turbines	110,000	6 Foster Wheeler	31 knots

Name	*Begun*	*Launched*	*Completed*	*Converted*	*Builders*
VICTORIOUS	4 May 1937	14 Sept. 1939	15 May 1941	1950–1958	Vickers-Armstrongs Ltd., Newcastle-on-Tyne

Note. Of the lighter carriers listed in the 1955 edition, the *Glory*, *Ocean* and *Theseus* have been broken up, *Triumph* has been converted into a heavy repair ship, *Vengeance* has been sold to Brazil and the *Warrior* has been sold to Argentina. Of the remaining carriers of the "Colossus" class, the *Colossus* was sold to France, the *Venerable* was sold to the Netherlands, and the maintenance carriers *Perseus* and *Pioneer* were scrapped. Of the later carriers of the "Majestic" class, the *Magnificent* and *Leviathan* are for disposal, *Hercules* was sold to India, *Powerful* was sold to Canada, and *Majestic* and *Terrible* were sold to Australia. The maintenance carrier *Unicorn* was scrapped.

VICTORIOUS

ENTERPRISE

THE first nuclear powered aircraft carrier in the world and the largest warship ever built. For a prototype ship of her size and novelty she was constructed in a remarkably short time, less than four years. The largest moving structure ever built by man, she has a flight deck with an area of 4½ acres. Her propulsion plant comprises eight pressurised water cooled nuclear reactors generating steam for a four-shaft arrangement of geared turbines. There are two reactors for each shaft, and the eight reactors feed 32 heat exchangers. She has an exceptionally broad flight deck, a block island superstructure, no funnels, a fully angled deck, four deck-edge elevators sited three on the starboard side and one on the port, and four steam catapults. She has almost unlimited steaming endurance at high speed without regard to the conserving of fuel, thus improving her offensive and defensive capabilities and reducing her replenishment requirements. She is capable of steaming for five years without refuelling. The absence of smoke stacks and boiler air intakes reduces the vulnerability of the power plant to battle damage and eliminates the possibility of radioactive or biological agents entering the ship.

Standard displacement	*Full load displacement*	*Length*	*Beam*	*Draught*
75,700 tons	85,800 tons	1,102 feet	133 feet *hull* 252 feet *deck*	37 feet

Guided weapons	*Aircraft*	*Catapults*	*Complement*
2 twin launchers for "Terrier" missiles	100	4 of C-13 steam type	4,600

Propelling machinery	*Shaft horse power*	*Nuclear reactors*	*Speed*
Geared steam turbines	300,000	8 of p.w.c. A 2 W type	35 knots

Name and No.	*Begun*	*Launched*	*Completed*	*Builders*	*Engineers*
ENTERPRISE CVAN 65	4 Feb. 1958	24 Sept. 1960	29 Dec. 1961	Newport News Shipbuilding & Dry Dock Company	Westinghouse Electric Corporation

ENTERPRISE

CONSTELLATION **INDEPENDENCE** **RANGER**
FORRESTAL **KITTY HAWK** **SARATOGA**

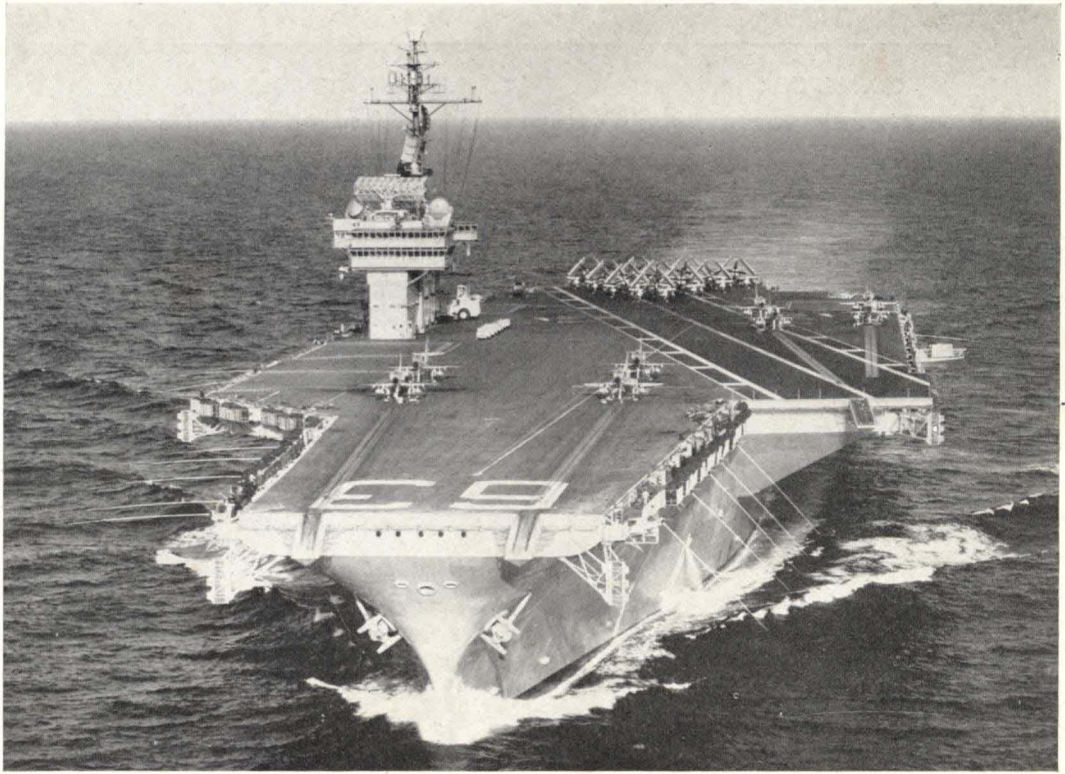
The largest aircraft carriers in the world, able to handle any existing or anticipated carrier-borne aircraft and to launch and retrieve aircraft simultaneously. They have four deck edge elevators, three to starboard and one to port, and three separate launching areas, with increased catapult and arresting capacity, larger elevators, higher hangar decks, mirror-sight deck-landing aids, more armour and improved underwater protection. The flight deck is a strength deck by reducing hangar openings, the bow is enclosed up to the flight deck for sea-worthiness in any weather, the island is acoustically constructed to obviate external noise, and berthing quarters are air-conditioned. Deck and funnel recognition numbers, see below.

Standard displacement	*Full load displacement*	*Length*	*Beam*	*Draught*
60,000 tons 59,650 (*Forrestal*)	76,000 tons 75,900 (*Forrestal*)	1,046 to 1,047½ feet o.a. 1,039 (*Forrestal*)	129½ feet w.l. 252 feet o.a.	37 feet
Main guns	*Guided missiles*	*Aircraft*	*Armour*	*Complement*
4–5 inch (none in *C.* and *K.H.*)	Regulus (*F.* and *S.*) Terrier (*C.* and *K.H.*)	90	5 inch	4,142 with air group
Propelling machinery		*Shaft horse power*	*Boilers*	*Speed*
Geared steam turbines (Westinghouse or General Electric)		260,000	8 Babcock & Wilcox	33 to 35 knots

Name	*No.*	*Begun*	*Launched*	*Completed*	*Builders*
CONSTELLATION	CVA 64	14 Sept. 1957	8 Oct. 1960	19 Jan. 1962	New York Navy Yard
FORRESTAL	CVA 59	14 July 1952	11 Dec. 1954	1 Oct. 1955	Newport News S.B. Co.
INDEPENDENCE	CVA 62	1 July 1955	6 June 1958	3 Apr. 1959	New York Navy Yard
KITTY HAWK	CVA 63	27 Dec. 1956	21 May 1960	9 June 1961	New York S.B. Corp.
RANGER	CVA 61	2 Aug. 1954	29 Sept. 1956	10 Aug. 1957	Newport News S.B. Co.
SARATOGA	CVA 60	16 Dec. 1952	8 Oct. 1955	14 Apr. 1956	New York Navy Yard

Note. AMERICA, an even larger attack aircraft carrier, conventionally powered and armed with guided missiles, was begun on 9 Jan. 1961: displacement 64,000 tons (77,000 tons full load); dimensions 1,046 o.a. × 252 o.a. × 37 feet; guided missiles 2 twin "Terrier" surface-to-air launchers; machinery 4 C-13 boilers and 4 geared turbines; S.H.P.: 280,000; speed 35 knots.

KITTY
HAWK



B

CORAL SEA **FRANKLIN D. ROOSEVELT** **MIDWAY**

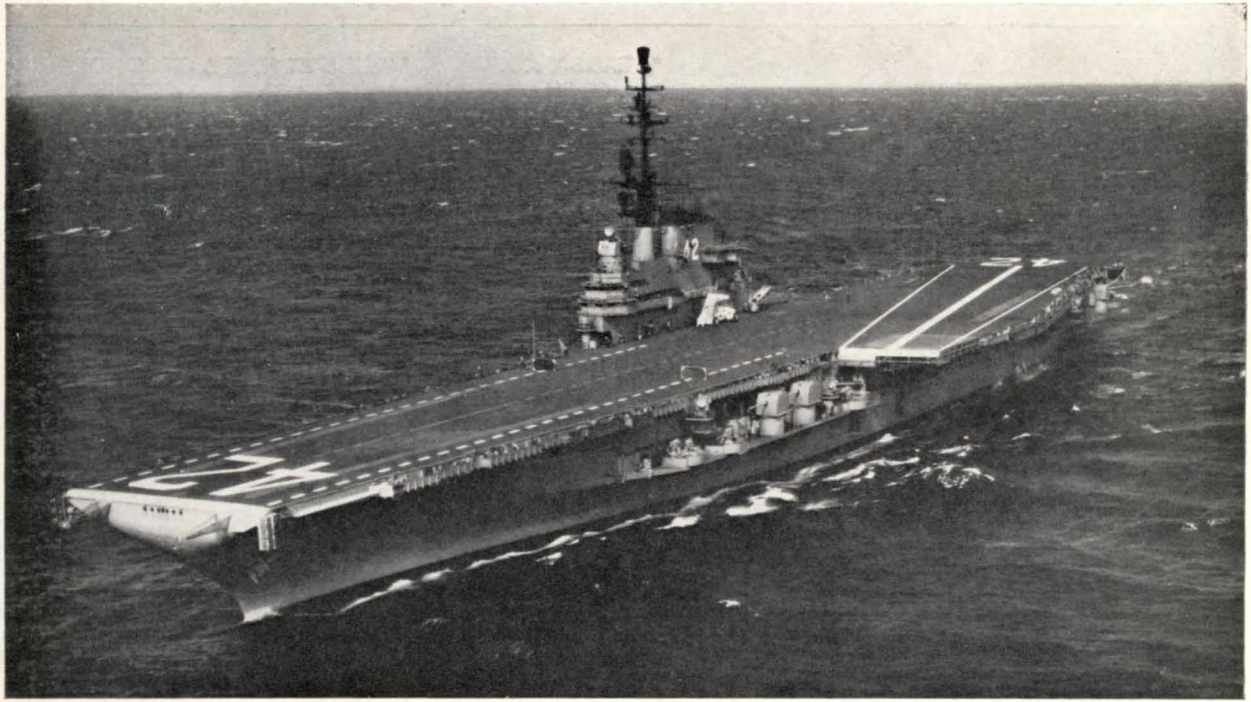
Among the largest aircraft carriers ever built, and only surpassed by the nuclear powered *Enterprise* and the six great mobile aerodromes of the "Forrestal" class; the "Midway" class cannot be confused with any other ships, their enormous funnel being their recognition feature. They were reconstructed in 1954–60 to handle larger and more modern aircraft. As converted they are fitted with the British invented angled deck (known by the Americans as the "canted deck"), enclosed ("hurricane") bows as in British carriers, and the British steam catapult. Even before the conversion they had handled 37-ton bombers. They were the first American vessels to be designed as a class with an armoured flight deck, common in British ships since early days. *Franklin D. Roosevelt* has a truncated conical stanchion and pole mast. *Midway* has a lattice mast. Identification numerals on funnels and flight deck: 43, 42, 41 respectively.

Standard displacement	*Full load displacement*	*Length*	*Beam*	*Draught*
51,000 tons	63,400 tons	968 feet o.a.	121 feet w.l. 174 feet o.a.	36 feet

Main guns	*Secondary guns*	*Aircraft*	*Armour*	*Complement*
10–5 inch	22–3 inch (twin) (except *Coral Sea*)	80	3 to 4 inch	3,354 with air group

Propelling machinery	*Shaft horse power*	*Boilers*	*Speed*
Geared steam turbines (Westinghouse or General Electric)	212,000	12 Babcock & Wilcox	33 knots

Name	*Begun*	*Launched*	*Completed*	*Converted*	*Builders*
CORAL SEA	10 July 1944	2 Apr. 1946	1 Oct. 1947	1957–1960	Newport News S.B. Co.
FRANKLIN D. ROOSEVELT	1 Dec. 1943	29 Apr. 1945	27 Oct. 1945	1954–1956	New York Navy Yard
MIDWAY	27 Oct. 1943	20 Mar. 1945	11 Sept. 1945	1955–1957	Newport News S.B. Co.



FRANKLIN D. ROOSEVELT

***ANTIETAM**	***ESSEX**	***KEARSARGE**	***PHILIPPINE SEA**	**TICONDEROGA**
***BENNINGTON**	***FRANKLIN**	***LAKE CHAMPLAIN**	***PRINCETON**	***VALLEY FORGE**
BON HOMME RICHARD	**HANCOCK**	***LEXINGTON**	***RANDOLPH**	***WASP**
***BOXER**	***HORNET**	***LEYTE**	**SHANGRI-LA**	***YORKTOWN**
***BUNKER HILL**	***INTREPID**	**ORISKANY**	***TARAWA**	

Ordered in 1940 these vessels were among the first in America's massive war emergency programme. Originally of uniform design there are now a number of variants. Nineteen ships* have been reclassified as A/S warfare support aircraft carriers, amphibious assault ships, or auxiliary aircraft transports, with reduced complements of aircraft and personnel. In 1952–59 fifteen ships of the class were equipped with the angled deck and some with steam catapults. The *Antietam* was the first aircraft carrier to be fitted with the angled deck.

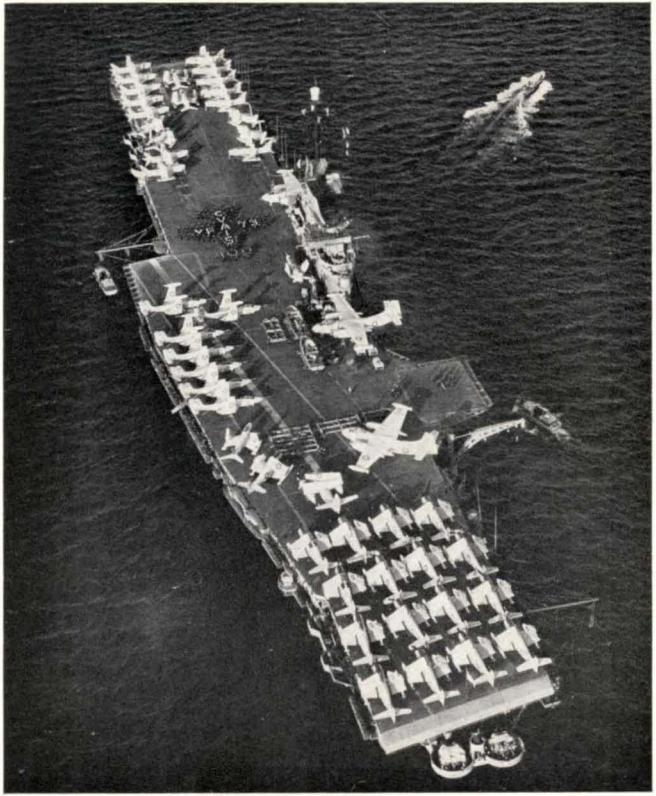
Standard displacement	*Full load displacement*	*Length*	*Beam*	*Draught*
30,800 to 33,100 tons	38,500 to 42,600 tons	878 to 904 feet	93 to 103 feet (hull) 113 to 129 feet (sponsons) 136 to 192 feet (extreme)	31 feet

Main guns	*Anti-aircraft guns*	*Aircraft*	*Armour*	*Complement*
7 to 12–5 inch	28–3 inch (twin mounts) (or 44 to 72–40 mm.)	50 to 70	3 inch side and deck	1,300 to 2,260 with air group

Propelling machinery	*Shaft horse power*	*Boilers*	*Speed*
Geared steam turbines	150,000	8 Babcock & Wilcox	33 knots

Essex, *Yorktown*, *Intrepid*, *Hornet*, *Franklin*, *Ticonderoga*, *Randolph*, *Boxer* and *Leyte* built by Newport News Shipbuilding Co.; *Lexington*, *Bunker Hill*, *Wasp*, *Hancock* and *Philippine Sea* by Bethlehem Steel Co.; *Bennington*, *B. H. Richard* and *Kearsarge* by New York Navy Yard; *Antietam*, *Princeton* and *Valley Forge* by Philadelphia Navy Yard; and *Shangri-La*, *Lake Champlain* and *Tarawa* by Norfolk Navy Yard. Names in order of construction. *Oriskany* by New York Navy Yard, ordered August 1942, laid down May 1944, launched 13 October 1945, and finally completed September 1950.

RANDOLPH



CLEMENCEAU **FOCH**

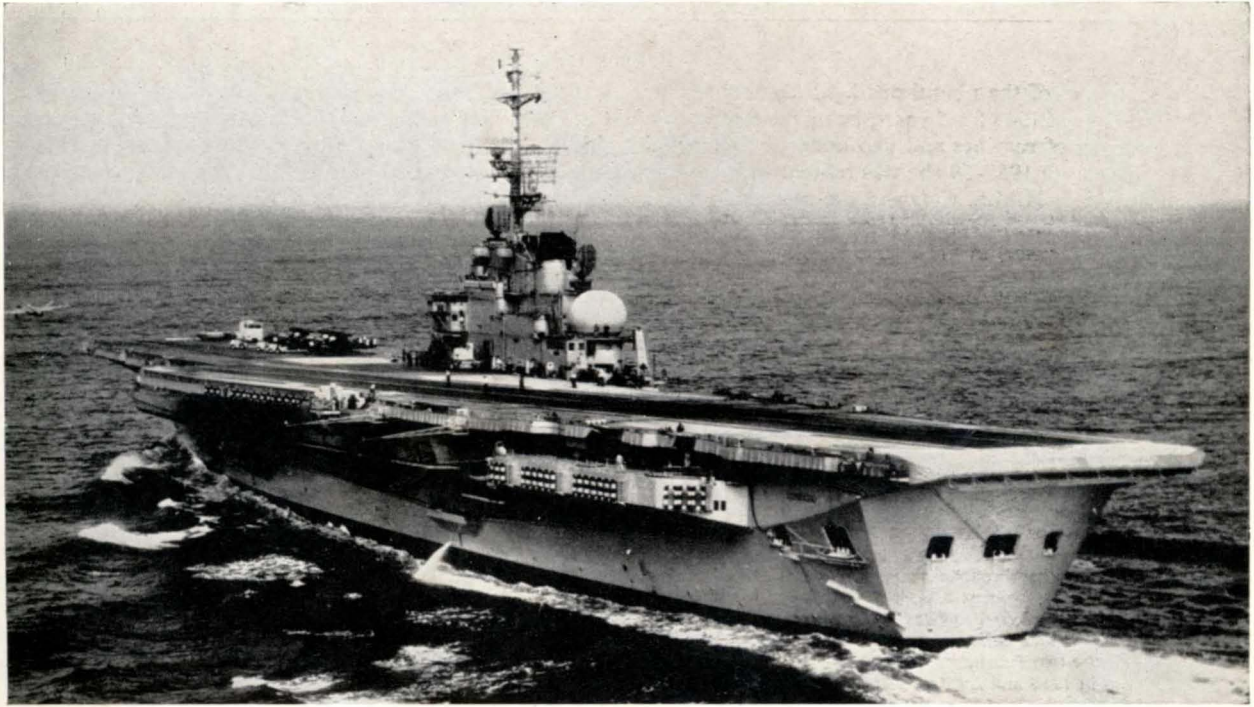
The *Clemenceau* is the first aircraft carrier designed and constructed in France from the keel up as such, and only the second warship of the category designed by the French, all previous aircraft carriers having been of foreign origin. Both ships have the angled deck incorporated, which accounts for their width, two British Mitchell-Brown steam catapults, two lifts, one of them on the starboard deck edge, and mirror-sight deck-landing aids. The flight deck measures 543 by 96¾ feet and is angled at eight degrees off the centre line. The original armament was to have been twenty-four 57-mm. guns in twin mountings, but this was first revised to twelve 100-mm. guns and then to eight 100-mm. (3.9 inch). The 1958 estimates provided for an aircraft carrier of 30,000 tons, the largest ever built in France, but owing to financial economies she was not laid down.

Standard displacement	*Full load displacement*	*Length*	*Beam*	*Draught*
22,000 tons 27,307 tons normal	31,000 tons	845 feet o.a.	96⅛ feet (hull) 151 feet (max.)	24 feet

Main guns	*Aircraft*	*Catapults*	*Complement*
8–3.9 inch	60 (*max.* capacity)	2 Mitchell-Brown steam	2,700

Propelling machinery	*Shaft horse power*	*Boilers*	*Speed*
Penhoët geared turbines	126,000	6	32 knots

Name	*Begun*	*Launched*	*Completed*	*Builders*
CLEMENCEAU	1 Nov. 1955	21 Dec. 1957	22 Nov. 1959	Brest Naval Dockyard
FOCH	1 Feb. 1957	23 July 1960	1 Aug. 1963	Ch. de l'Atlantique (Penhoet-Loire) and Brest



CLEMENCEAU

ARROMANCHES

A vessel of the ubiquitous light fleet carrier type of the Royal Navy, this ship was lent to the French Navy in August 1946 for 5 years, being purchased outright in 1951. Her engines and boilers are arranged *en echelon*, one set of turbines and two boilers being installed side by side in each of the two main propelling machinery spaces. In 1957–59 she was refitted with the angled deck at 4 degrees and mirror-sight deck-landing sponsons. Formerly H.M.S. *Colossus*, the name-ship of her class, she was a sister ship of the *Glory*, *Ocean*, *Theseus* and *Triumph* in the Royal Navy, the *Karel Doorman* (ex-*Venerable*) in the Netherlands Navy, the *Minas Gerais* (ex-*Vengeance*) in the Brazilian Navy, and the *Independencia* (ex-*Warrior*) in the Argentine Navy.

Standard displacement	*Full load displacement*	*Length*	*Beam*	*Draught*
14,000 tons	19,600 tons	695 feet	80 feet (hull) 118 feet (o.a.)	23½ feet

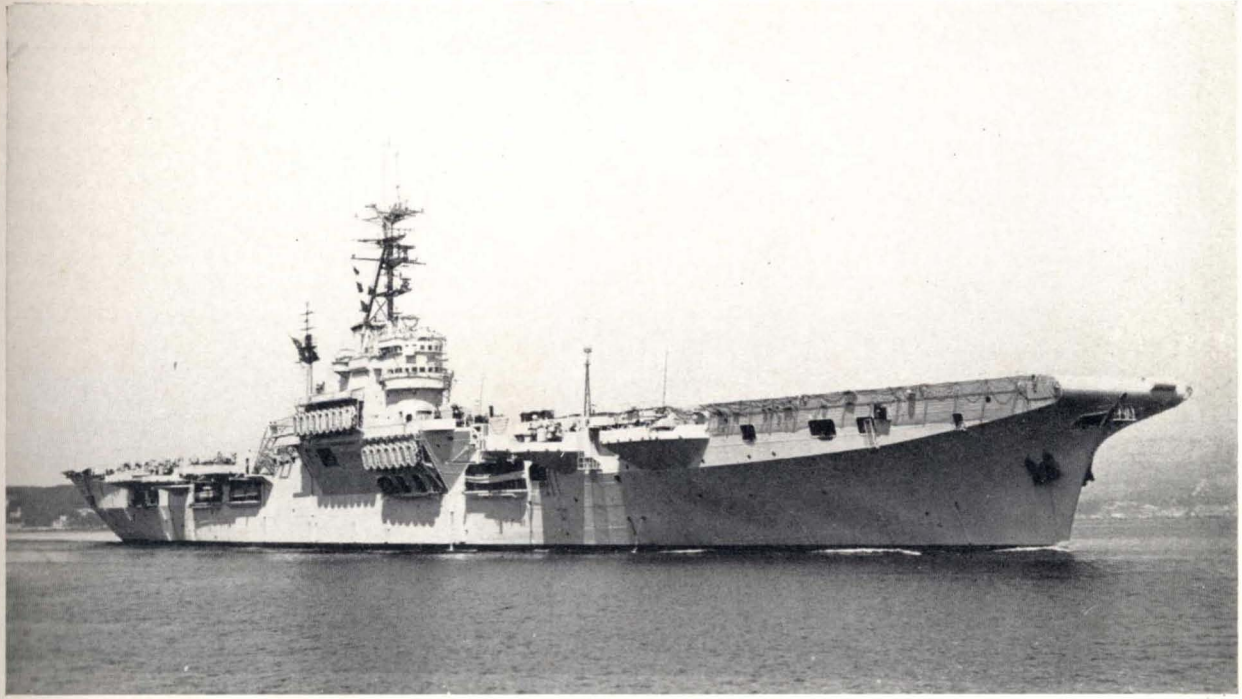
Anti-aircraft guns	*Aircraft*	*Complement*
Formerly 43–40 mm. (now removed)	30 to 34 capacity (24 carried)	1,019 (1,620 *max.* accommodation)

Propelling machinery	*Shaft horse power*	*Boilers*	*Speed*
Parsons geared turbines	40,000	4 3-drum type	23·5 knots

Name	*Begun*	*Launched*	*Completed*	*Builders*	*Engineers*
ARROMANCHES	1 June 1942	30 Sept. 1943	16 Dec. 1944	Vickers-Armstrongs, Tyne	Builders

Note: Another French aircraft carrier was the *Dixmude* (ex-H.M.S. *Biter*, ex-*Rio-Parana*), of 8,200 tons displacement with a speed of 16 knots, built as a U.S. cargo ship, converted into an auxiliary aircraft carrier by the Sun S.B. & D.D. Co., Chester, Pa. in 1941, transferred to Great Britain as an escort carrier in 1942, and retransferred to the French Navy in 1945. She was latterly classed as an aviation transport, and is now used as a port depot ship.

Of the two fast light fleet aircraft carriers (see 1960 Edition), on loan from the U.S.A., *Bois Belleau* was returned to the U.S. Navy in 1960 and *La Fayette* in 1963.



ARROMANCHES

MELBOURNE **SYDNEY**

The first aircraft carriers of the Royal Australian Navy, these vessels were formerly of the British "Majestic" class, being the ex-*Majestic* and ex-*Terrible*, respectively. The *Melbourne* differs considerably from the *Sydney* and is fitted with a 6 degree angled deck, steam catapult, and mirror deck-landing sights. Both vessels, however, were originally sister ships of the *Leviathan* and *Magnificent* in the Royal Navy, the *Bonaventure* (ex-H.M.S. *Powerful*) in the Royal Canadian Navy and the *Vikrant* (ex-H.M.S. *Hercules*) in the Indian Navy. Deck recognition letters are: *Melbourne* M and *Sydney* S (formerly Y and K, respectively). It was officially stated that *Melbourne* would remain in commission after 1963 as an anti-submarine helicopter carrier, 27 Westland Wessex anti-submarine helicopters having been ordered from Great Britain. *Sydney* formerly employed in a flying training role, was converted into a fast military transport in 1962.

	Standard displacement	*Full load displacement*	*Length*	*Beam*	*Draught*
Melbourne:	16,000 tons	20,000 tons	701½ feet	80 feet (126 o.a.)	25 feet
Sydney:	14,380 tons	19,550 tons	698 feet	80 feet (112½ o.a.)	25 feet

	Anti-aircraft guns	*Aircraft*	*Complement*
Melbourne:	25–40 mm.	22 to 27	1,209 to 1,250
Sydney:	Formerly 30–40 mm. (removed)		226 + Naval Reserve

Propelling machinery	*Shaft horse power*	*Boilers*	*Speed*
Parsons geared turbines	40,000	4 Admiralty	24½ knots

Name	*Begun*	*Launched*	*Completed*	*Builders*	*Engineers*
MELBOURNE	15 Apr. 1943	28 Feb. 1945	8 Nov. 1955	Vickers-Armstrongs Ltd., Barrow	Builders
SYDNEY	19 Apr. 1943	30 Sept. 1944	5 Feb. 1949	H.M. Dockyard, Devonport	Parsons

MEL-
BOURNE

BONAVENTURE

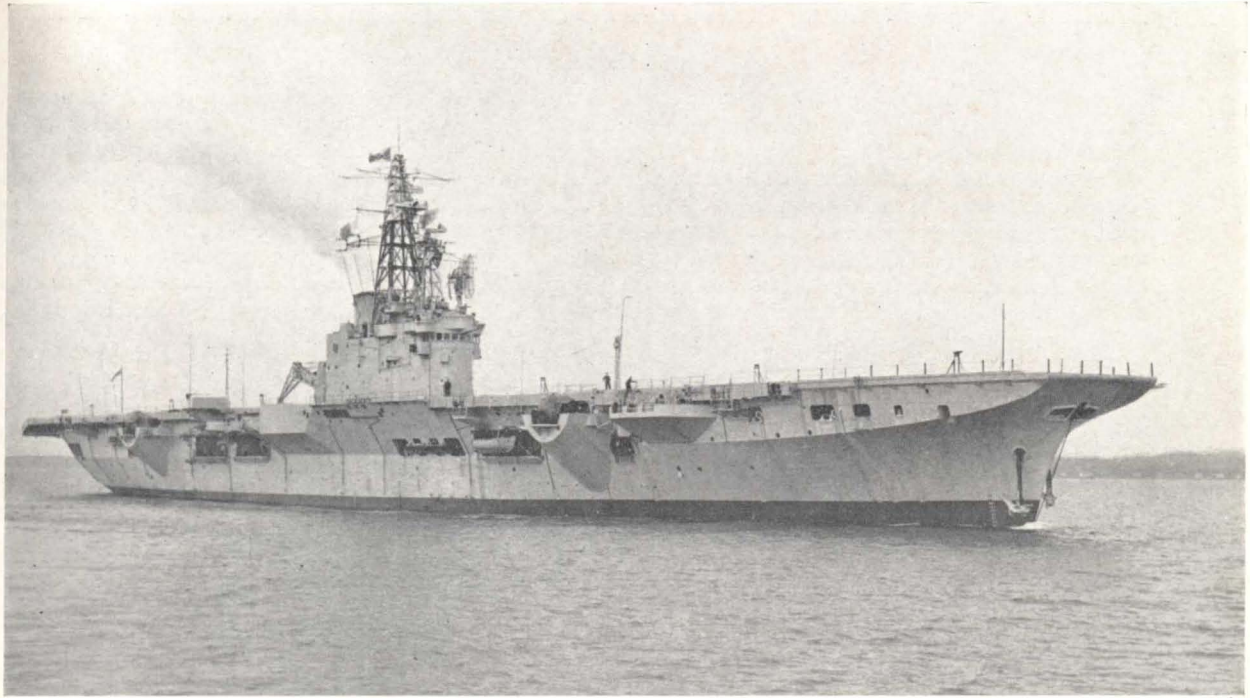
The first aircraft carrier owned outright by the Royal Canadian Navy, this ship replaced the *Magnificent*, on loan from the Royal Navy from 1946 to 1957. Formerly the suspended *Powerful*, of the British "Majestic" class, the *Bonaventure* was redesigned and resumed in 1952, plans having been revised to provide a completely modern aircraft carrier fitted with the angled deck. Her reconstruction included the strengthening of the flight deck and elevators, improvements in deck arrester gear, and the installation of the new British steam catapult capable of launching jet aircraft. Unlike other vessels of this type in the Commonwealth navies, the *Bonaventure* does not carry a deck recognition letter, but an identification serial number, 22, painted on the flight deck. She was a sister ship of the *Leviathan* and *Magnificent* in the Royal Navy, *Melbourne* (ex-*Majestic*) and *Sydney* (ex-*Terrible*) in the Royal Australian Navy, and *Vikrant* (ex-*Hercules*) in the Indian Navy.

Standard displacement	*Full load displacement*	*Length*	*Beam*	*Draught*
16,000 tons	20,000 tons	704⅝ feet	80 feet (hull) 128 feet (o.a.)	25 feet

Main and anti-aircraft guns	*Aircraft*	*Complement*
8–3 inch	34 (*max.* capacity)	1,370 war

Propelling machinery	*Shaft horse power*	*Boilers*	*Speed*
Parsons geared turbines	40,000	4 Admiralty	24½ knots

Name	*Begun*	*Launched*	*Completed*	*Builders*	*Engineers*
BONAVENTURE	27 Nov. 1943	27 Feb. 1945	17 Jan. 1957	Harland & Wolff, Belfast	Builders



BONAVENTURE

KAREL DOORMAN

Formerly H.M.S. *Venerable*, this ship was another of the British light fleet aircraft carriers of the "Colossus" class sold abroad. She was purchased from Great Britain on 1 April 1948 and commissioned in the Royal Netherlands Navy on 28 May of that year. The *Karel Doorman* underwent refit and modernisation in 1955–58, including a heavier modified angled flight deck, steam catapult, mirror-sight deck-landing system and new anti-aircraft battery, at the Wilton-Fijenoord Shipyard, at a cost of 25 million guilders instead of the 11 million guilders originally appropriated. Her reconstruction and conversion seems to have been particularly successful and her unusually tall build up at the island superstructure presents a handsome appearance. With a new island and bridge and a lattice tripod radar mast, and a tall raked funnel, she differs considerably from her former appearance and from her original sister ships in the British, French, Argentine and Brazilian navies. Deck recognition letter: D.

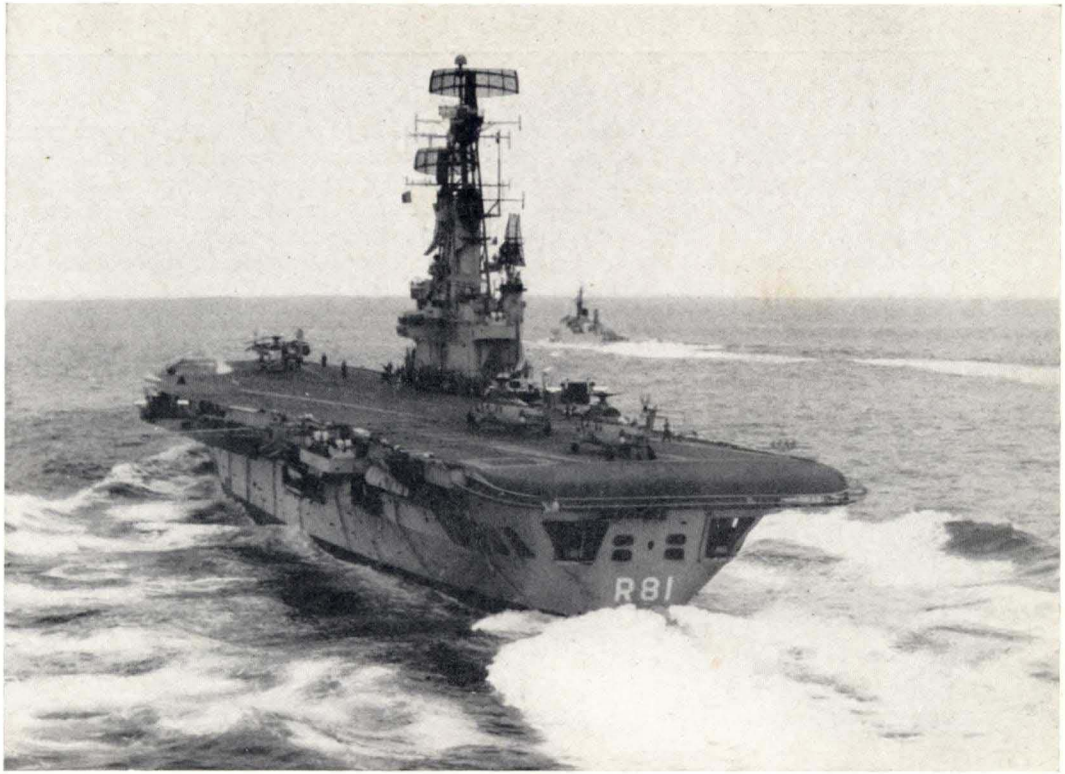
Standard displacement	*Full load displacement*	*Length*	*Beam*	*Draught*
15,892 tons	19,896 tons	$693\frac{1}{6}$ feet	80 feet (hull) $121\frac{1}{3}$ feet (o.a.)	$24\frac{1}{2}$ feet

Main and anti-aircraft guns	*Aircraft*	*Complement*
12–40 mm. (latest model)	16 + 2 helicopters (capacity 21)	1,509

Propelling machinery	*Shaft horse power*	*Boilers*	*Speed*
Parsons geared turbines	40,000	4 of 3-drum type	24.25 knots

Name	*Begun*	*Launched*	*Completed*	*Builders*	*Engineers*
KAREL DOORMAN	3 Dec. 1942	30 Dec. 1943	17 Jan. 1945	Cammell Laird & Co., Birkenhead	Builders

KAREL
DOORMAN



VIKRANT

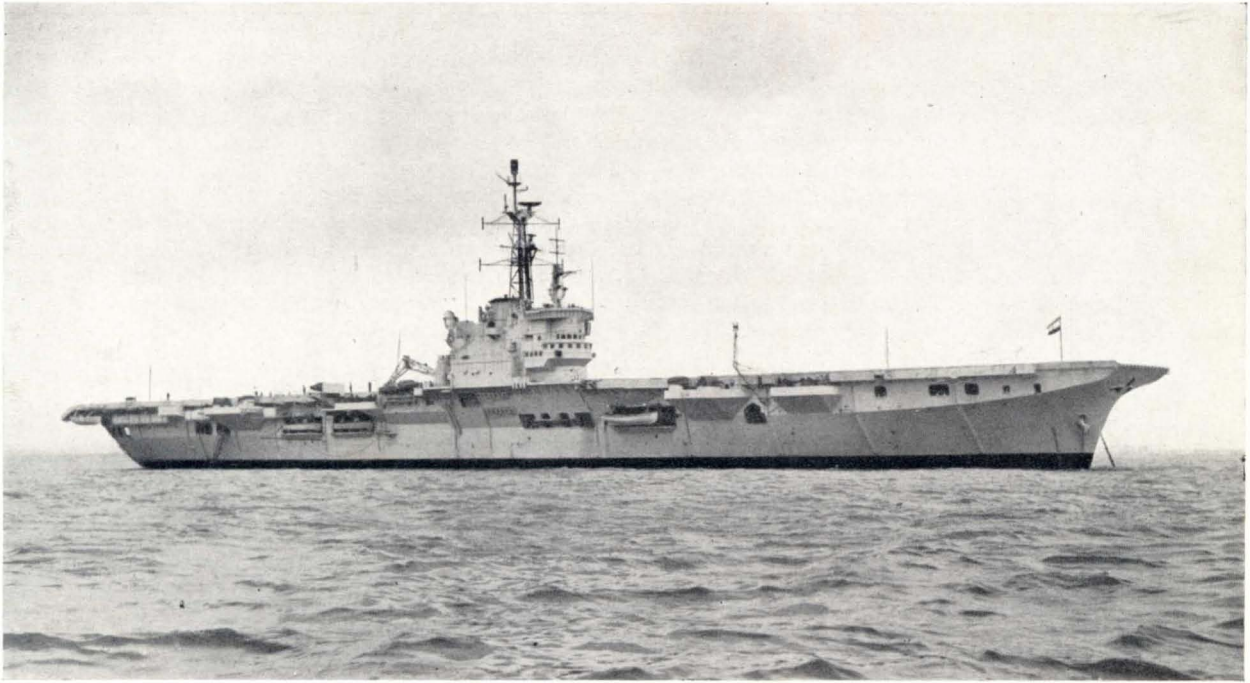
The construction of H.M.S. *Hercules* was suspended in May 1946. When she was structurally approaching completion and was about 75 per cent fitted out the contract was cancelled and in May 1947 she was laid up at Faslane, Scotland. In January 1957 she was acquired from the Government of Great Britain for the Indian Navy, and in April 1957 she arrived at Belfast to be taken in hand for large scale reconstruction and modernisation by Harland & Wolff Ltd., estimated to take up to four years to complete. She is equipped with the angled deck, steam catapult, deck landing sights, and other recent British inventions, two electrically operated aircraft lifts; and she is air-conditioned and insulated for tropical service. Her aircraft complement consists of Sea Hawk strike and Breguet Alize anti-submarine aircraft. She was a sister ship of the *Leviathan* and *Magnificent* in the Royal Navy, the *Melbourne* (ex-*Majestic*) and *Sydney* (ex-*Terrible*) in the Royal Australian Navy, and the *Bonaventure* (ex-*Powerful*) in the Royal Canadian Navy.

Standard displacement	*Full load displace ment*	*Length*	*Beam*	*Draught*
16,000 tons	19,550 tons	700 feet	80 feet (hull) 128 feet (o.a.)	24 feet

Anti-aircraft guns	*Aircraft*	*Complement*
15–40 mm. (4 twin, 7 single)	21 (capacity)	Accommodation designed for 1,343

Propelling machinery	*Shaft horse power*	*Boilers*	*Speed*
Parsons geared turbines	42,000	4 Admiralty	24½ knots

Name	*Begun*	*Launched*	*Completed*	*Builders*	*Engineers*
VIKRANT	14 Oct. 1943	22 Sept. 1945	4 Mar. 1961	Vickers-Armstrongs Ltd., Tyne	Parsons



c VIKRANT

INDEPENDENCIA

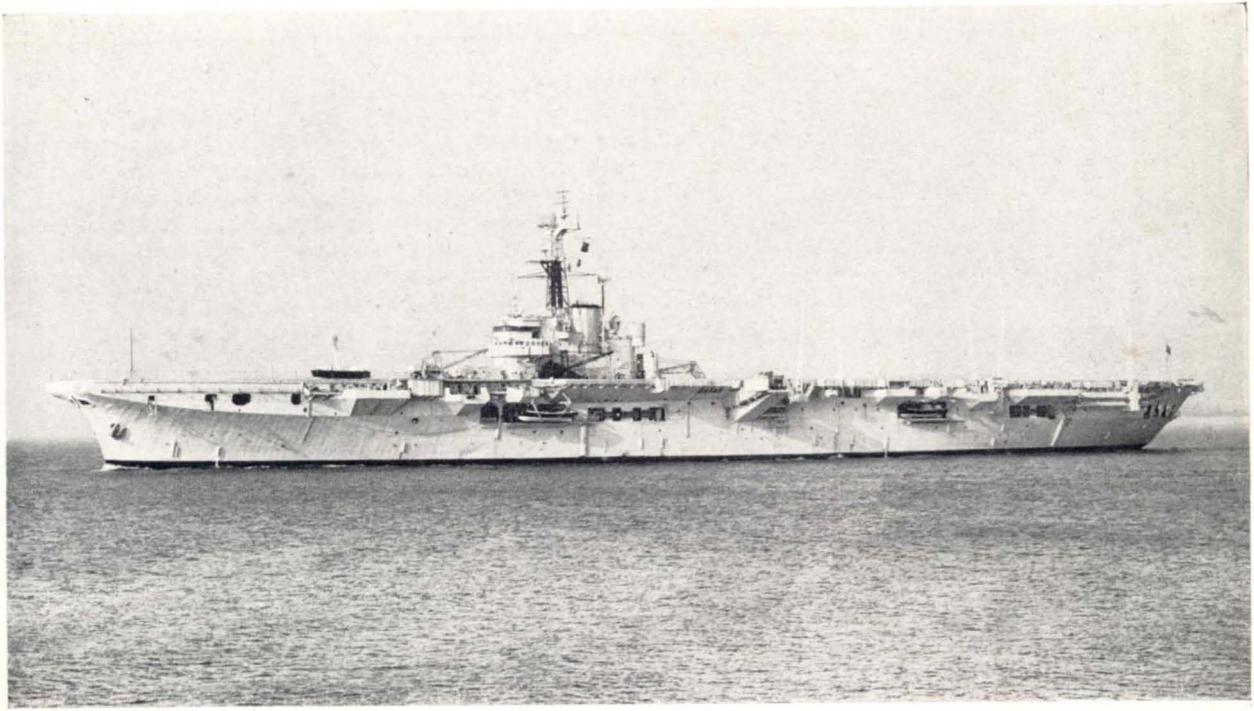
This ship has had rather a chequered career. Formerly H.M.S. *Warrior*, on completion she was lent by Great Britain to the Royal Canadian Navy from 1946 to 1948, but was returned and served in the British Navy from 1948 onwards. In 1948–49 she was used as a trials ship for flexible landing deck experiments. She was modernised in 1952–53 with lattice foremast and extended and enlarged bridgework, and again reconstructed in 1955–56 with the partially angled deck and improved arrester gear. She acted as the headquarters ship in the Christmas Island atomic experiments in 1957. In 1958 she was sold to the Argentine Government and renamed *Independencia*, becoming Argentina's first aircraft carrier. She is the only vessel of the original light fleet aircraft carriers of the "Colossus" class to be fitted with the angled deck before sale, although her sister ships *Arromanches* (ex-H.M.S. *Colossus*) in the French Navy, *Karel Doorman* (ex-H.M.S. *Venerable*) in the Royal Netherlands Navy, and *Minas Gerais* (ex-H.M.S. *Vengeance*) in the Brazilian Navy were so fitted after sale.

Standard displacement	*Full load displacement*	*Length*	*Beam*	*Draught*
14,000 tons 18,400 tons normal	19,540 tons	695 feet	80 feet (hull) 118 feet (o.a.)	23½ feet

Anti-aircraft guns	*Aircraft*	*Complement*
8–40 mm.	21 (capacity)	1,076 (peace), 1,300 (war)

Propelling machinery	*Shaft horse power*	*Boilers*	*Speed*
Parsons geared turbines	40,000	4 Admiralty	24·25 knots

Name	*Begun*	*Launched*	*Completed*	*Builders*
INDEPENDENCIA	12 Dec. 1942	20 May 1944	24 Jan. 1946	Harland & Wolff Ltd., Belfast



INDEPENDENCIA

MINAS GERAIS

Brazil's first aircraft carrier. Formerly H.M.S. *Vengeance* of the British "Colossus" class of light fleet aircraft carriers, she served in the British Navy from 1945 onwards, and in 1948–49 was fitted out for an experimental cruise to the Arctic. She was lent to the Royal Australian Navy early in 1953 but was returned to the Royal Navy in August 1955. She was sold to the Brazilian Navy at the end of 1956 and renamed *Minas Gerais*. She was reconstructed at Rotterdam in 1957–60, the conversion and modernisation including the installation of the British invented angled deck, new British steam catapult, British mirror-sight deck-landing system and complete armament fire control and radar equipment. She was originally a sister ship of the *Arromanches* (ex-H.M.S. *Colossus*) in the French Navy, *Karel Doorman* (ex-H.M.S. *Venerable*) in the Royal Netherlands Navy, and *Independencia* (ex-H.M.S. *Warrior*) in the Argentine Navy.

Standard displacement	*Full load displacement*	*Length*	*Beam*	*Draught*
15,890 tons 17,500 tons normal	19,890 tons	695 feet	80 feet (hull) 121 feet (o.a.)	23½ feet

Anti-aircraft guns	*Aircraft*	*Complement*
10–40 mm. (2 quadruple, 2 twin)	21 (capacity)	1,000 (1,300 with air group)

Propelling machinery	*Shaft horse power*	*Boilers*	*Speed*
Parsons geared turbines	40,000	4 Admiralty	25 knots

Name	*Begun*	*Launched*	*Completed*	*Builders*
MINAS GERAIS	16 Nov. 1942	23 Feb. 1944	15 Jan. 1945	Swan, Hunter & Wigham Richardson, Wallsend-on-Tyne

MINAS GERAIS

ALBION **BULWARK**

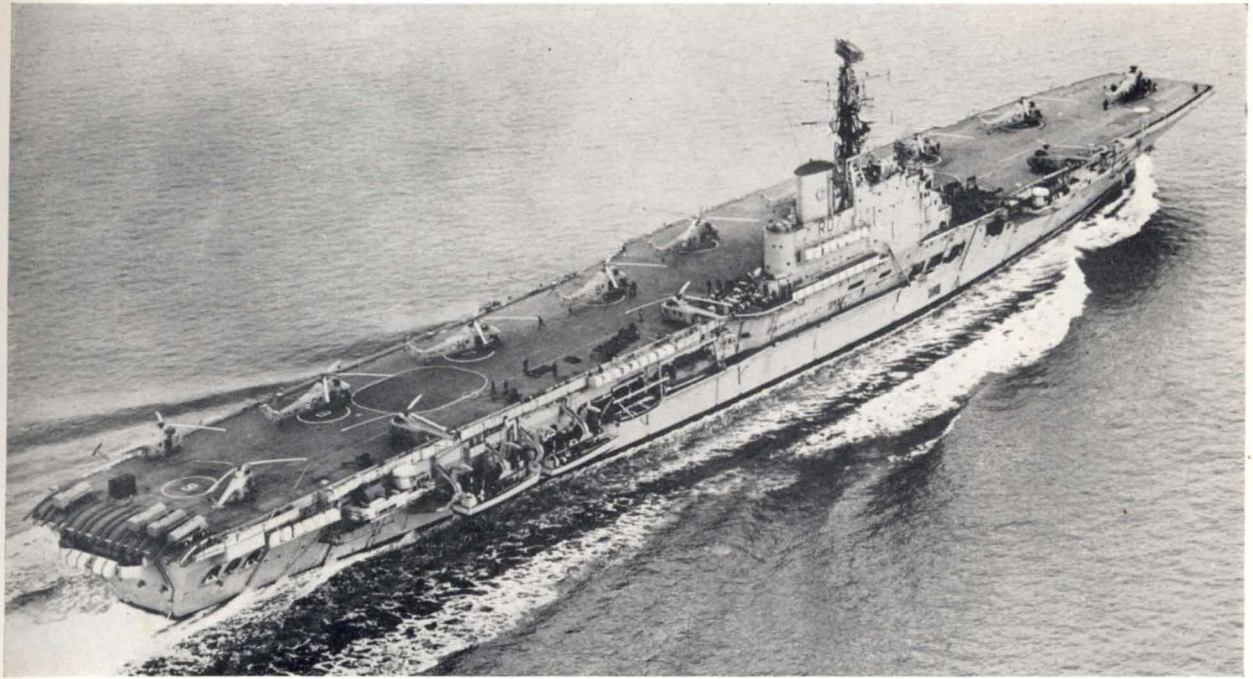
These were originally sister ships of the aircraft carrier *Centaur*, see page 10, but they were converted into commando carriers in 1961–62 and 1959–60, respectively, in H.M. Dockyard, Portsmouth. A full strength commando is available, which the ships can quickly transport and land complete with equipment, wherever required. The ships' helicopters are also able to disembark the commandos' vehicles. The ships have on board sufficient stores and fuel to support the commandos in active operations ashore, and can re-embark the unit speedily when required. These commando carriers not only reinforce the traditionally close association of the Corps of Royal Marines with the Royal Navy, but give these versatile troops greater mobility and usefulness, and enable them to be fully self-supporting. These ships are fully convertible to the anti-submarine role. They are able, at short notice, and entirely within their own resources, to adapt their helicopters for anti-submarine work. Eight 40 mm. anti-aircraft guns were removed during the conversion of *Bulwark* to provide space for four assault landing craft carried at built-in gantries. As converted *Albion* has one twin 40 mm. mounting in each quadrant. *Albion* is similar to *Bulwark*, but embodied a number of improvements and is able to carry Wessex instead of Whirlwind helicopters. Her extensive modifications included alterations to the angled flight deck and the removal of catapult and arrester gear, thus obviating the fixed-wing capability. In 1963 *Bulwark* was taken in hand for further refit and improvements to bring her up to the same standard as *Albion*.

Standard displacement	*Full load displacement*	*Length*	*Beam*	*Draught*
22,300 tons	27,300 tons	737¾ feet o.a.	90 feet w.l. 123½ feet o.a.	28 feet

Anti-aircraft guns	*Aircraft*	*Landing craft*	*Armour*
8–40 mm. (4 twin)	16 helicopters	4 LCA	Flight deck and waterline side belt

Propelling machinery	*Shaft horse power*	*Boilers*	*Speed*	*Complement*
Geared steam turbines	78,000	4 Admiralty 3-drum	28 knots	1,037 plus 733 commando

Name	*Begun*	*Launched*	*Completed*	*Converted*	*Builders*
ALBION	23 Mar. 1944	6 May 1947	26 May 1954	1961–62	Swan, Hunter & Wigham Richardson
BULWARK	10 May 1945	22 June 1948	4 Nov. 1954	1959–60	Harland & Wolff Ltd., Belfast



ALBION

GUADALCANAL **GUAM** **IWO JIMA** **OKINAWA**

Iwo Jima was the first amphibious assault ship designed and built as such from the keel up specifically for helicopter operations. She and her sister ships of this new category approximately correspond with the commando carrier type in the Royal Navy. Each ship of the "Iwo Jima" class can carry twenty to 45 helicopters according to size and type. The vessels have two deck-edge elevators, one on the port side before the superstructure and the other on the starboard side abaft the island. Designed to support and fully exploit the Marine Corps vertical envelopment concept for the conduct of modern amphibious operations, each carrier will transport a helicopter assault force consisting of approximately 2,000 personnel, essential combat supplies and equipment. They have the most modern command facilities, the latest type of cargo and material handling equipment, and adequate space for embarked vehicles. The flight and hangar decks provide efficient helicopter operations and maintenance. Two more sister ships are under construction.

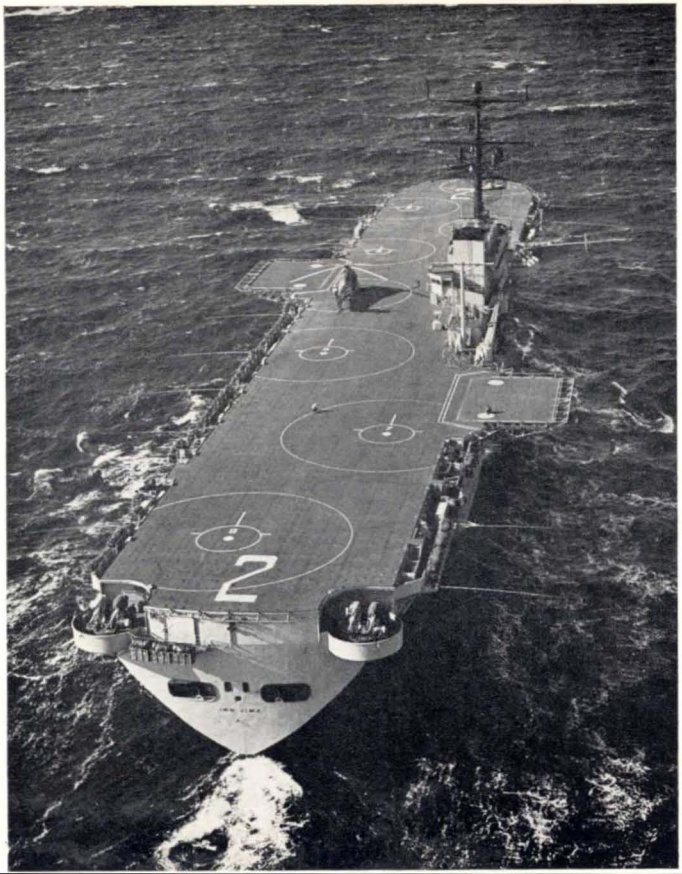
Standard displacement	*Full load displacement*	*Length*	*Beam*	*Draught*
17,000 tons	18,340 tons	600 feet	84 feet *hull* 105 feet *deck*	25 feet

Armament	*Aircraft*	*Complement*
8–3 inch anti-aircraft guns (2 twin on stern, 2 twin before island)	20 large CH-37C amphibious transport or 30 light UH-34D Seahorse helicopters	900 crew + 2,000 troops

Propelling machinery	*Shaft horse power*	*Boilers*	*Speed*
Geared steam turbines	22,000	4	20 knots

Name	*No.*	*Begun*	*Launched*	*Completed*	*Builders*
GUADALCANAL	LPH 7	1 Sept. 1961	1 Aug. 1962	25 Jan. 1963	Philadelphia Naval S.Y.
GUAM	LPH 9	15 Nov. 1962	Feb. 1964	Nov. 1964	Philadelphia Naval S.Y.
IWO JIMA	LPH 2	13 Feb. 1959	17 Sept. 1960	30 Oct. 1961	Puget Sound Naval S.Y.
OKINAWA	LPH 3	1 Apr. 1960	19 Aug. 1961	13 Apr. 1962	Philadelphia Naval S.Y.

IWO JIMA



THETIS BAY

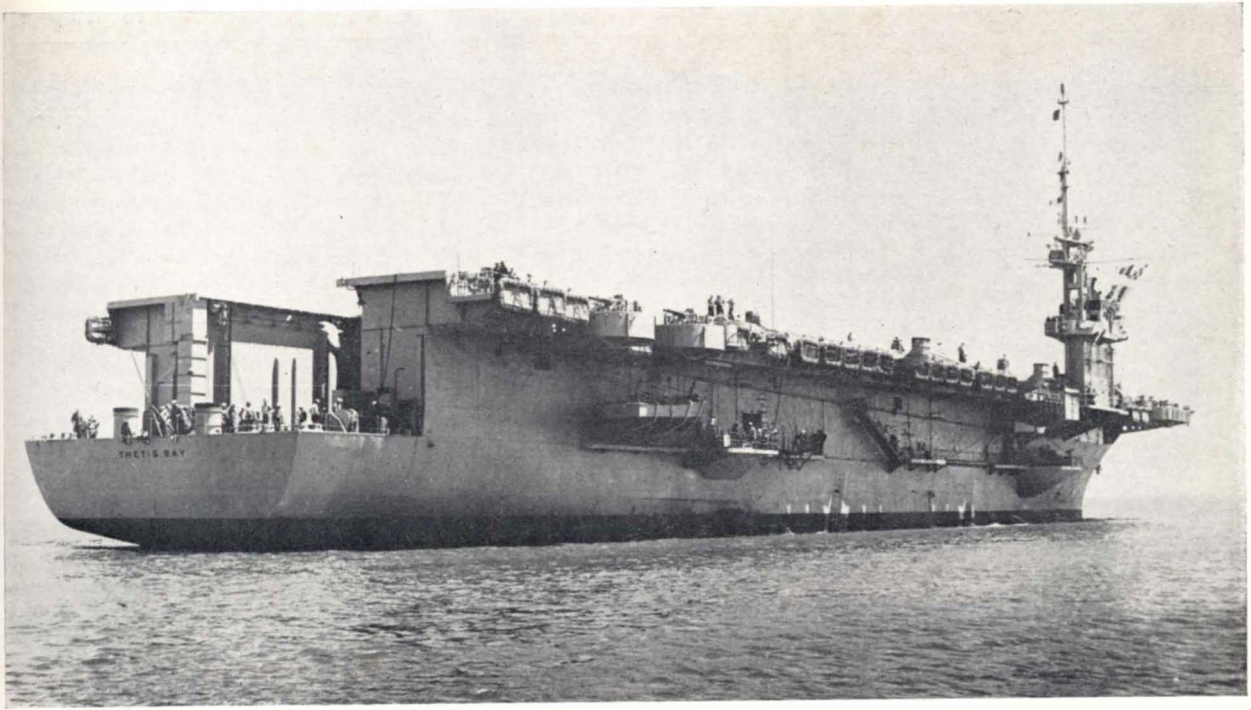
This ship is the sole survivor of a class of 50 war emergency escort aircraft carriers designed and built as carriers (unlike earlier escort carriers converted from mercantile hulls) which were the famed "jeep carriers" of the Pacific invasions. Their aircraft, manned by crews hastily trained for ground-support work only, were the sole aircraft available to support the land troops for some time until shore airstrips could be built. During June 1955–July 1956 the *Thetis Bay* was converted into an Assault Helicopter Aircraft Carrier at San Francisco Naval Shipyard. Her reconstruction included the elimination of catapults and arrestor gear, the enlarging and resiting of elevators, the removal of the after end of the flight deck to provide an open lift, and quarters for marine troops. She was originally built by the Henry J. Kaiser Co., Inc., Vancouver, Wash. being laid down on 22 Dec. 1943, launched on 16 Mar. 1944, and completed on 21 Apr. 1944.

Standard displacement	*Full load displacement*	*Length*	*Beam*	*Draught*
8,000 tons	11,000 tons	501 feet	65 feet (hull) 108 feet (o.a.)	20 feet

Main guns	*Anti-aircraft guns*	*Aircraft*	*Complement*
Removed	16–40 mm. (8 twin)	15 to 20 helicopters	930 crew + 1,600 troops

Propelling machinery	*Indicated horse power*	*Boilers*	*Speed*
Skinner Unaflow reciprocating engines	11,200	2	19.5 knots

Note: Cape Esperence, Corregidor, Tripoli and *Windham Bay*, which served as aircraft ferry ships with the Military Sea Transportation Service, were discarded in 1959, and their place in the MSTS was taken by the *Breton, Card, Core* and *Croatan*, see 1960 Edition. *Anzio, Fanshaw Bay, Guadalcanal, Kasaan Bay, Makassar Strait, Manila Bay, Mission Bay, Munda, Natoma Bay, Petrof Bay, Saginaw Bay, Sargent Bay, Shamrock Bay, Shipley Bay, Steamer Bay*, and *White Plains* were scrapped in 1959. The surviving ships were reclassified as Aircraft Ferrys (AKV) in 1959 and stricken in 1960, viz.: *Bougainville, Hoggatt Bay, Hollandia, Kadasham Bay, Kwajalein, Lunga Point, Marcus Island, Matanikau, Nehenta Bay, Rudyerd Bay, Savo Island, Sitkoh Bay* and *Tukanis Bay*.



THETIS BAY

LA RESOLUE

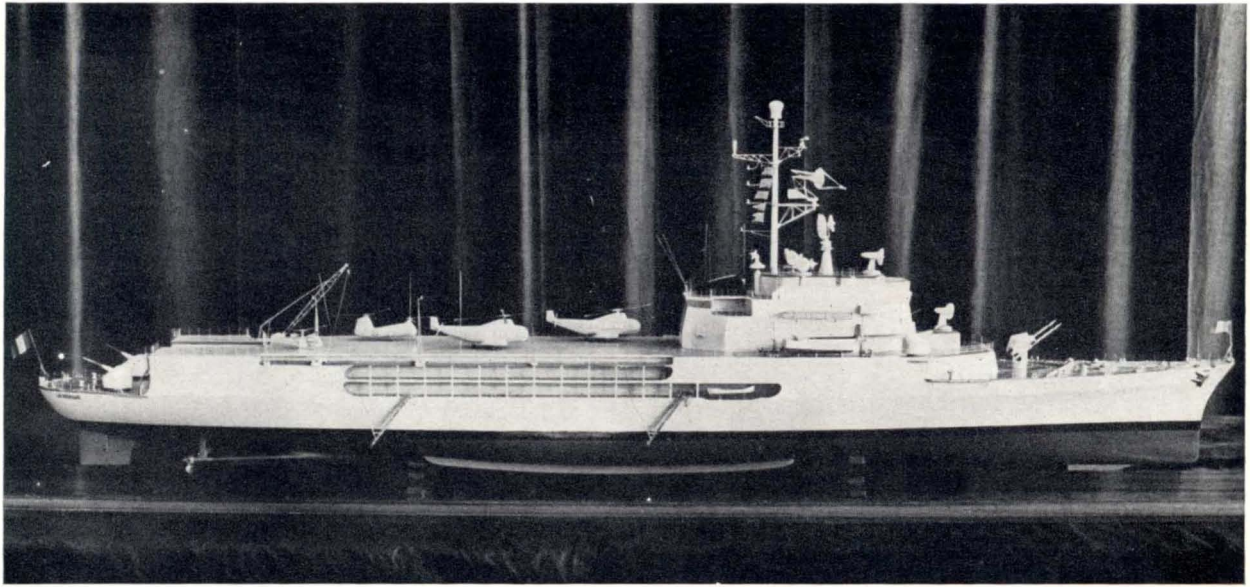
This ship is of a most remarkable and interesting hybrid type. The design involved the embodiment of a multiple concept to fulfil the general purpose roles of cruiser, helicopter carrier, commando ship, guided missile ship, troop transport and cadet training ship. Not surprisingly, in such a novel prototype, she was modified several times during her planning and early construction stages. She was originally designed to mount six 3.9-inch (100 mm.) guns (now four) and a quadruple mortar, now replaced by a twin launcher for "Masurca" surface-to-air guided missiles. Her helicopter platform, which extends for nearly two-fifths of the overall length of the ship and overhangs the beam, measures 230 by 85 feet. Her steam-raising plant is of advanced design, working at a pressure of 640 lbs. per square inch and a temperature of 842 degrees Fahrenheit (450 degrees Centigrade) of superheat. In time of peace *La Resolue* is to be used for the training of 192 officer cadets; but in the event of war, after rapid modification, she will be employed as a helicopter carrier and commando carrier or troop transport with full commando equipment and a battalion of 700 men. She is expected to be commissioned for trials in July 1963 and to be ready for operational service in June 1964. The name *La Resolue* is only a temporary one until the decommissioning of the training cruiser *Jeane d'Arc* which is scheduled to be discarded in 1964 when she will be relieved by *La Resolue* which will then take the name *Jeanne d'Arc.*

Standard displacement	*Full load displacement*	*Length*	*Beam*	*Draught*
10,000 tons	13,000 tons	590½ feet	78¾ feet	20½ feet

Guided weapons	*Guns*	*Aircraft*	*Complement*
1 twin launcher forward for "Masurca" missiles	4–3.9 inch anti-aircraft (single)	8 heavy helicopters (ASM machines)	1,050

Propelling machinery	*Shaft horse power*	*Boilers*	*Speed*
Geared steam turbines	40,000	4 multitubular	26.5 knots

Name	*Begun*	*Launched*	*Completed*	*Builders*	*Engineers*
LA RESOLUE	7 July 1960	30 Sept. 1961	1 June 1964	Brest Dockyard	Rateau-Bretagne



LA RESOLUE

SAIPAN **WRIGHT**

These conversions of former aircraft carriers provide specialised command ships, each completely fitted out to serve as a mobile command post afloat for top echelon commands and staff for the strategic direction of area or world-wide military operations. Facilities are provided for world-wide communications and rapid, automatic exchange, processing, storage and display of command data. In this conversion a portion of the hangar deck space was utilised for the special command spaces and the extensive electronics equipment required, while the major portion of the flight deck, except that necessary for helicopters, was utilised for specially designed communications antenna arrays. Facilities are provided for operating and supporting three helicopters. *Wright* was converted under the 1962 conversion programme and *Saipan* under the 1963 conversion programme. These ships have had rather a chequered history. Modifications of the design of the "Baltimore" class of heavy cruisers, they were laid down and built as aircraft carriers of the CVL type, but the hull below the main deck (hangar deck) duplicated that of the heavy cruisers. Both ships had four funnels, but the fore funnel was subsequently removed. As aircraft carriers they originally carried over 50 aircraft and the war complement was 1,821, comprising 243 officers and 1,578 men, but only 775 of 1,007 enlisted men were retained in *Saipan* as training carrier. Both ships were reclassified from aircraft carriers (CVL) to aircraft transports (AVT) in 1959. *Wright* was reclassified as command ship (CC) in 1962 and *Saipan* in 1963.

Standard displacement	*Full load displacement*	*Length*	*Beam*	*Draught*
14,500 tons	19,600 tons	684½ feet	76¾ feet (w.l.) 109 feet (o.a.)	28 feet

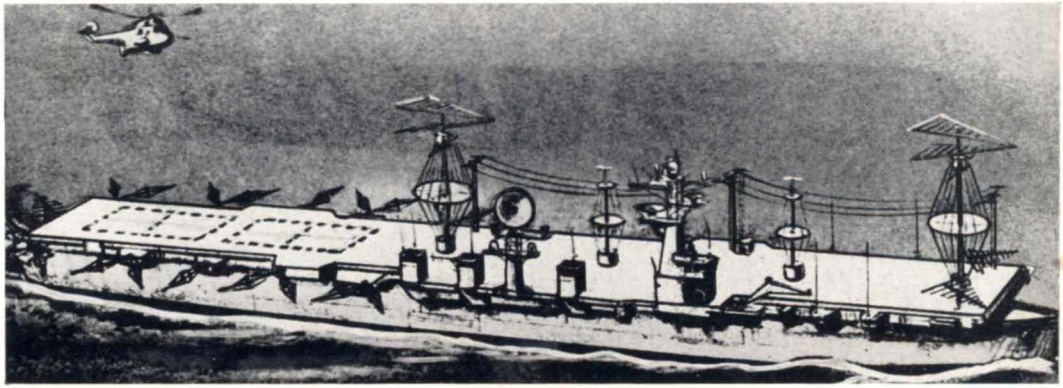
Propelling machinery	*Shaft horse power*	*Boilers*	*Speed*	*Aircraft*
Geared steam turbines	120,000	4 Babcock & Wilcox	33 knots	3 helicotpers

Name	*Begun*	*Launched*	*Completed*	*Builders*
SAIPAN	10 July 1944	8 July 1945	14 July 1946	New York Shipbuilding Corporation, N.J.
WRIGHT	21 Aug. 1944	1 Sept. 1945	9 Feb. 1947	New York Shipbuilding Corporation, N.J.

Note: Of the five former aircraft carriers (CVL) of the "Cowpens" class, reclassified as auxiliary aircraft transports (AVT) in 1959, *Bataan* and *Cowpens* were scrapped in 1960, and *Cabot*, *Monterey* and *San Jacinto* are decommissioned.

WRIGHT (*as aircraft carrier*)

WRIGHT (*as command ship*)



NORTHAMPTON

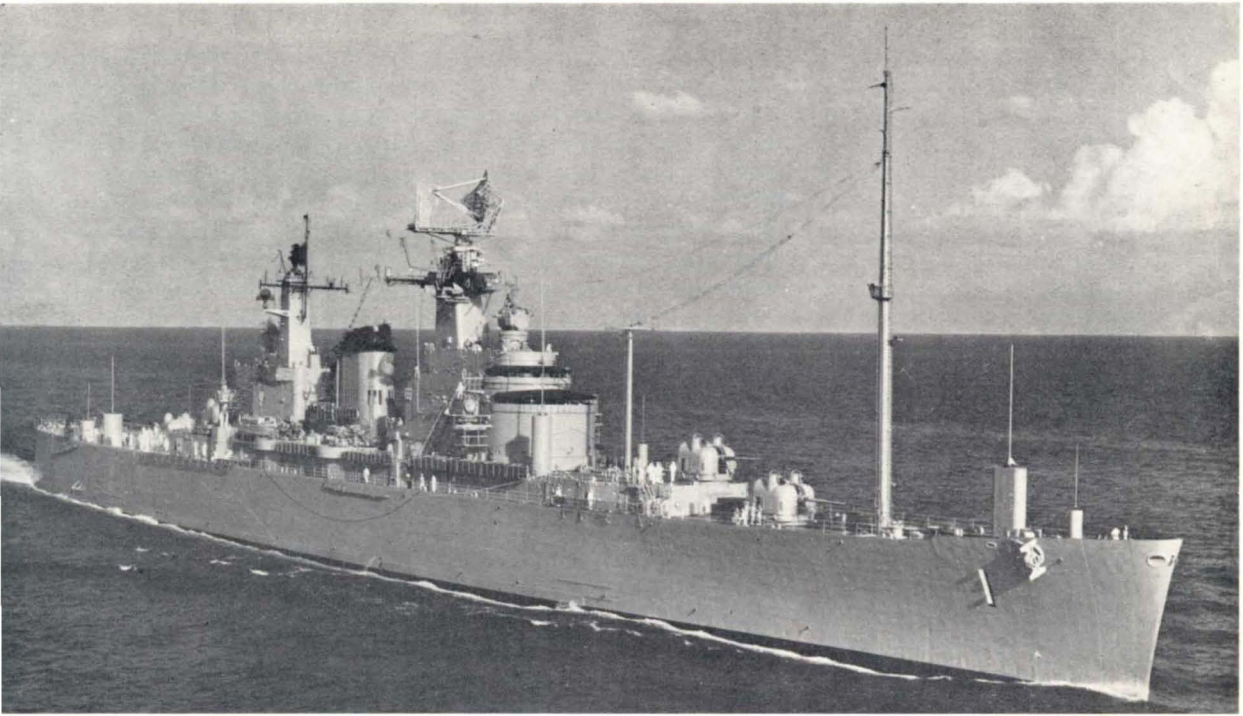
This vessel was originally designed as a heavy cruiser of the modified "Oregon City" class. After she was 57 per cent constructed as such she was redesigned as a Task Force (later Tactical) Command Ship, a rating unique in the world's navies, for the exclusive use of task force commanders in conducting either operations of fast moving carrier forces or an amphibious assault. Accommodation and equipment were modified accordingly, and the *Northampton* disposes of a radar communications system of a complexity not possible to mount in even an aircraft carrier without detracting from the ship's fighting efficiency. She is one deck higher than a normal cruiser to provide for additional office space, has the tallest unsupported mast afloat, and features one of the largest seaborne radar aerials in the world. In 1961 she was reclassified from Tactical Command Ship (CLC) to Command Ship (CC).

Standard displacement	*Full load displacement*	*Length*	*Beam*	*Draught*
14,700 tons	17,200 tons	676 feet	71 feet	29 feet

Main guns	*Anti-aircraft guns*	*Aircraft*	*Armour*	*Complement*
4–5 inch	8–3 inch	2 helicopters	6 inch side, 5 inch deck	1,251 war

Propelling machinery	*Shaft horse power*	*Boilers*	*Speed*
Geared steam turbines	120,000	4 Babcock & Wilcox	33 knots

Name	*Begun*	*Launched*	*Completed*	*Builders*	*Engineers*
NORTHAMPTON	31 Aug. 1944	27 Jan. 1951	7 Mar. 1953	Bethlehem Steel Co., Quincy	G.E.C.



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NORTHAMPTON

CRUISERS

THE term cruiser denoted a self-sufficient fighting ship able to cruise independently half across the world without refuelling, a vessel of high speed, adequate protection and substantial armament which although inferior in fighting power to the battleship was superior to all other types of warships. The main functions of modern cruisers are to patrol the main ocean highways for the defence of sea-borne trade, to search the outer seas and narrow waters for enemy surface raiders attempting to destroy merchant ships carrying vital cargoes, to destroy merchant ships of the enemy or otherwise interfere with his commerce, to hunt down, bring to action and destroy hostile cruisers or armoured ships known to have escaped from a blockaded port or to be at large, to act as scouts and provide reconnaissance for the main task force at sea, keeping in touch with the enemy and communicating his movements, duties which have now largely been taken over by aircraft or reduced by the use of wireless, to form a screen against lighter craft when in company with battleships or aircraft carriers, and to carry out the important duty of "showing the Flag". There has always been a wide variation of both displacement and armament within the cruiser category. The generic term cruiser once included all ships not ranked as fighting ships of the line and was applied indiscriminately to frigates, corvettes, sloops and cutters. Later it was used to describe a variety of types ranging from rapid little scouts of 2,000 tons to the monster armoured gun platforms of 14,000 tons, really second-class battleships, which came into the category of cruising ships at the turn of the century. The ultimate development of the armoured cruiser was represented by the *Minotaur*, *Defence* and *Shannon* of 14,600 tons carrying four 9·2-inch guns and ten 7·5-inch guns at a speed of 23 knots. Formerly cruisers were divided into 1st, 2nd and 3rd classes, but in 1913 the terms cruiser and light cruiser were introduced. In a rapid succession of light cruisers the eight scouts of 2,670 to 2,940 tons with 3-inch guns were succeeded by the four "Town" classes of 4,800 to 5,400 tons with 6-inch guns. The "Arethusa" class of 3,500 tons completed in 1914 were oil fired, with turbines, a speed of 28½ knots, carrying 6-inch and 4-inch

guns. The numerically large "C" class of 3,750 to 4,290 tons with four or five 6-inch guns were followed by the "D" class of 4,850 tons with six 6-inch guns and the "E" class of 7,580 tons with seven 6-inch guns and a speed of 33 knots. Meanwhile the semi-heavy cruisers of the "Hawkins" class had appeared with a displacement of 9,770 tons and a main armament of seven 7·5-inch guns. For six years after 1918 no cruisers were laid down. When construction was resumed under the restrictions of the Washington Treaty it resulted in 13 "County" class cruisers of 10,000 tons with eight 8-inch guns and two "City" class cruisers of 8,390 tons with six 8-inch guns. From these heavy cruisers a reversion was made to cruisers of moderate dimensions. The "Leander" and "Perth" classes of 6,830 to 7,270 tons carried eight 6-inch guns and were followed by the altruistically inspired diminutions of the "Arethusa" class of 5,220 tons with six 6-inch guns. In the succeeding group of eight large cruisers of the "Southampton" class the triple turret was introduced for the first time in British cruisers. These, of 9,100 to 9,600 tons, originally mounted twelve 6-inch guns, and were regarded in the fleet as one of the most successful cruiser designs ever produced. These were followed by 16 anti-aircraft light cruisers, eleven of the "Dido" class and five of the Improved "Dido" class, with displacements of 5,770 to 5,900 tons and a main armament of eight or ten 5·25-inch guns. Admiral of the Fleet Earl Jellicoe estimated the number of cruisers necessary for the protection of British seaborne trade to be an absolute minimum of seventy, a figure not attained since 1919. On the outbreak of the Second World War Great Britain had 60 cruisers, but she lost 30 cruisers during the six years of hostilities and she built 30 cruisers under war emergency programmes, so that she still had 60 cruisers at the end of the war. By 1955 these had been reduced to 23 cruisers, and Great Britain had only five cruisers in 1963. There are 42 cruisers in the United States Navy comprising 21 heavy cruisers, including three of 17,000 tons, and 21 light cruisers, including two of 14,700 tons. Russia has 22 cruisers, including 16 of 15,450 tons.

BLAKE **LION** **TIGER**

These three modern, though conventionally armed, cruisers had a remarkable building history. Originally laid down in the middle of the Second World War, they were not launched until the end, when their completion was no longer urgent. Work on them stopped in July 1946, and they were laid up pending review of their armament, dependent on research then in progress. They remained suspended until Oct. 1954, when it was officially announced they would be resumed, and they were dismantled ready for rebuilding to a new design in 1955, being completed in 1959–60 with two of the new fully automatic 6-inch twin turrets disposed in "A" and "Y" positions (instead of three 6-inch triple turrets in "A", "B" and "Y" positions) and three of the new pattern 3-inch twin turrets disposed one in "B" position and two abreast in "Q" position (instead of ten 40-mm. anti-aircraft guns). These have a rate of fire far in excess of earlier similar calibre guns. The ship built as *Defence* was renamed *Lion* in 1957.

Standard displacement	*Full load displacement*	*Length*	*Beam*	*Draught*
9,550 tons	11,700 tons	555½ feet	64 feet	21 feet

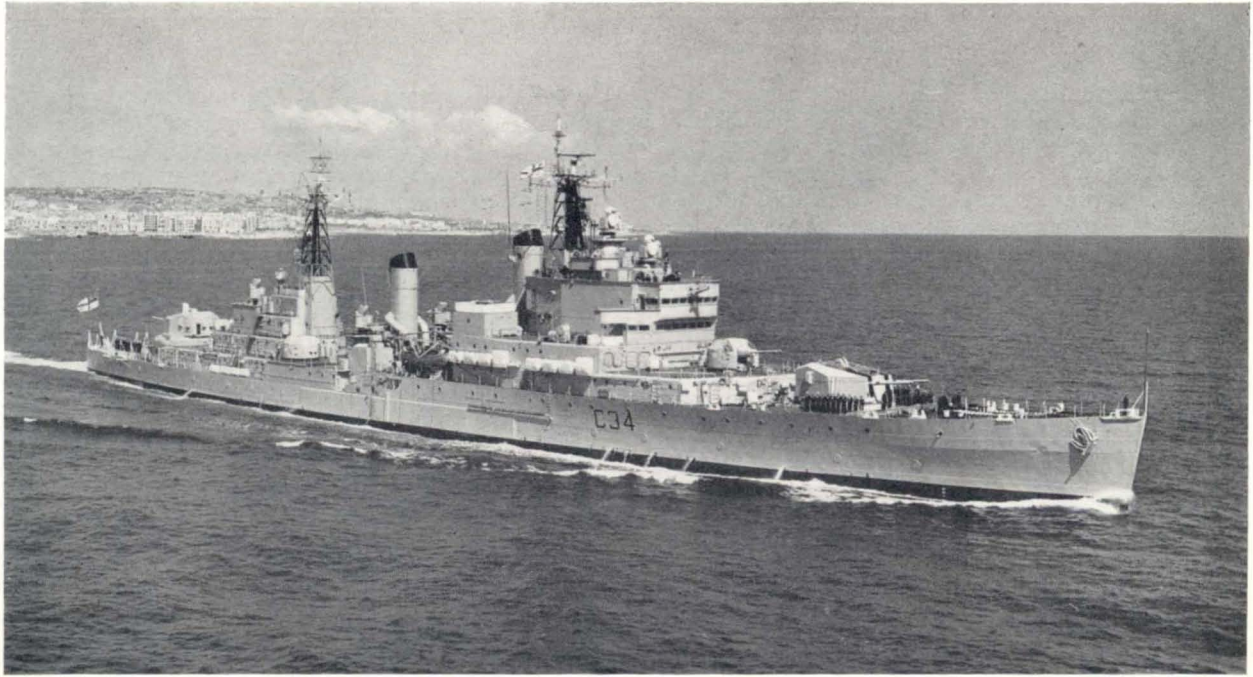
Main guns	*Secondary guns*	*Armour*	*Complement*
4–6 inch	6–3 inch	4 inch	698 to 717

Propelling machinery	*Shaft horse power*	*Boilers*	*Speed*
Parsons geared turbines	75,500	4 Admiralty 3-drum	31·5 knots

Name	*Begun*	*Launched*	*Completed*	*Builders and Engineers*
BLAKE	17 Aug. 1942	20 Dec. 1945	8 Mar. 1961	Fairfield S.B. & Eng. Co., Ltd., Govan
LION	24 June 1942	2 Sept. 1944	20 July 1960	Scotts' S.B. & Eng. Co., Ltd., Greenock*
TIGER	1 Oct. 1941	25 Oct. 1945	17 Mar. 1959	John Brown & Co., Ltd., Clydebank

*To launching stage. Hull completed by Swan, Hunter & Wigham Richardson, Wallsend. Main machinery completed by the Wallsend Slipway & Engineering Co., Ltd.

Note: The cruisers *Bermuda, Gambia* and *Mauritius* of the "Colony" class were awaiting disposal in 1963. *Sheffield* is Reserve Fleet Headquarters Ship at Portsmouth, and *Belfast* is in reserve at Devonport.



LION

LONG BEACH

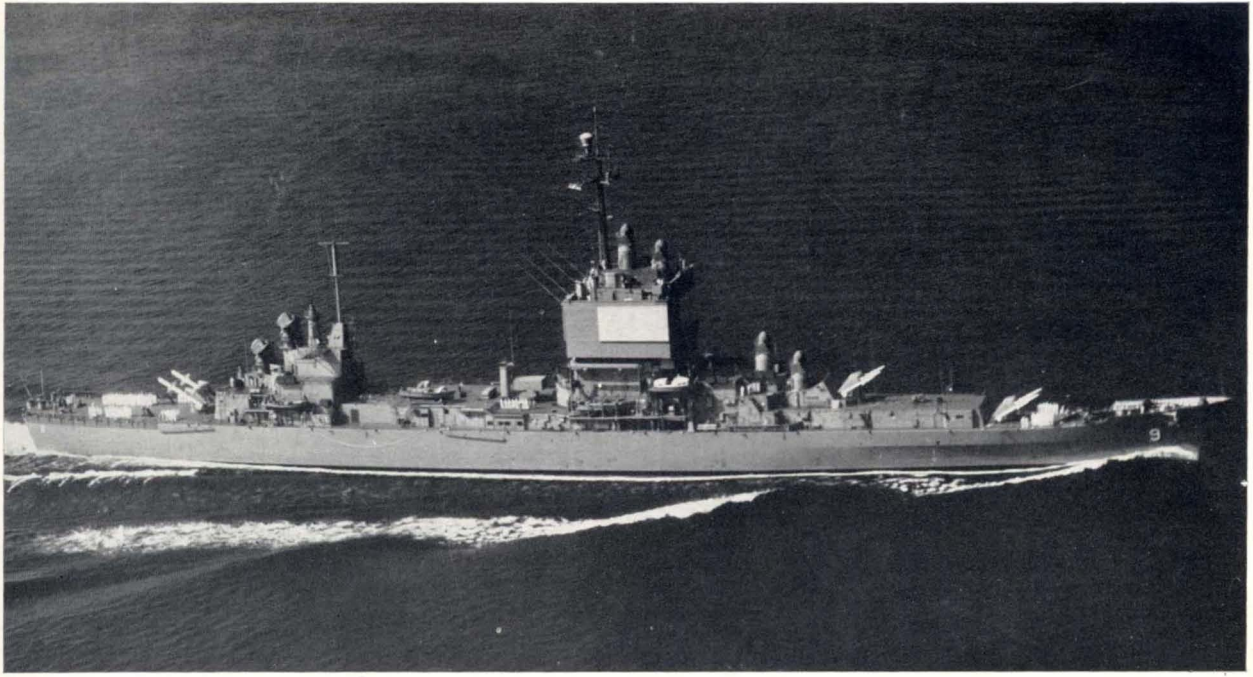
This is the first ship designed and constructed from the keel up as a cruiser for the United States since the end of the Second World War, the first surface ship armed with a main battery of guided missiles and powered by a nuclear engineering plant, and the first nuclear-powered surface fighting ship in the world. She was designed to operate offensively and independently of other forces under conditions of nuclear warfare, and is capable of operating against aircraft, guided missiles, surface or sub-surface opposition singly or in support of other forces in both nuclear and non-nuclear warfare. In addition to equipment and weapons for detecting and destroying enemy submarines she carries most of the United States Navy's modern guided missiles. These include "Regulus II", "Talos" and "Terrier", offensive to enemy attack launched from air, sea, land or underwater, whether by missile or conventional assault. The most modern improvements in electronic detection devices are installed in the new ship, which projects a radically new picture into future war capabilities. Unlike previous cruisers she has no armour.

Standard displacement	*Full load displacement*	*Length*	*Beam*	*Draught*
14,200 tons	15,947 tons	721¼ feet	73¼ feet	27¾ feet

Guided missiles	*Anti-submarine weapons*	*Guns*
"Regulus" surface-to-surface amidships 1 twin "Talos" surface-to-air launcher aft 2 twin advanced "Terrier" surface-to-air launchers forward	ASROC launcher amidships	2–5 inch (single)

Propelling machinery	*Shaft horse power*	*Nuclear reactors*	*Speed*	*Complement*
2 geared steam turbines by General Electric Company	80,000	2 pressurised water cooled by Westinghouse Electric Corporation	30.5 knots	1,020

Name	*Begun*	*Launched*	*Completed*	*Builders*	*Engineers*
LONG BEACH	2 Dec. 1957	14 July 1959	1 Sept. 1961	Bethlehem Steel Company, Quincy, Mass.	Westinghouse Electric Corp. and General Electric Co.



LONG BEACH

DES MOINES **NEWPORT NEWS** **SALEM**

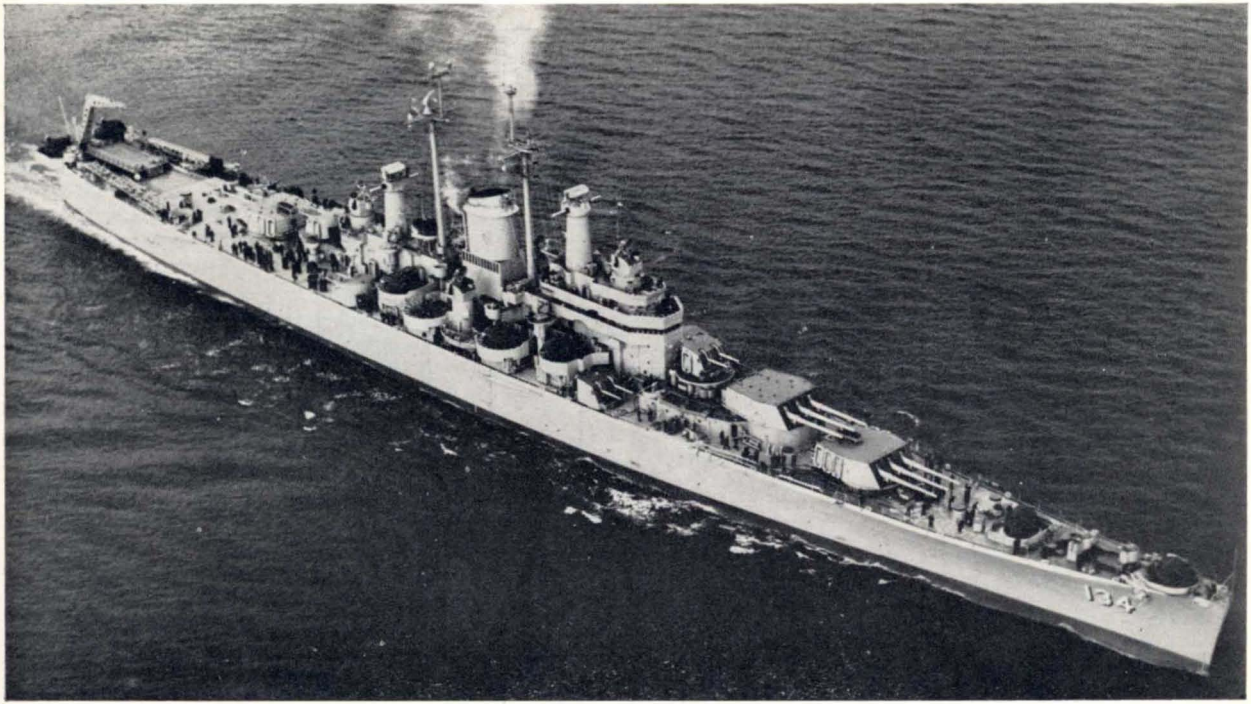
The biggest cruisers ever built, these ships mount the new fully automatic 8-inch gun. The large tonnage can be accounted for by the extra magazine space required and the great amount of loading and handling gear. The class is, in fact, nearly twice the size of the standard British cruiser and carries twice the complement. New type main armament is said to be capable of a twenty-round-a-minute rate of fire, brass cartridge cases having replaced the old wrapped charges. Whilst capable of delivering an incredible weight of shellfire in a short time, the ship might be at a disadvantage if a shell hit, disorganised or put out of action the complex loading and fusing mechanism, forcing turret crews to go into local control and manual handling. Superstructure is not so heavy, and they have pole masts, but their great size is emphasised by the fact that they were thirty-seven feet longer than the battleships of the "Indiana" class (now scrapped).

Standard displacement	*Full load displacement*	*Length*	*Beam*	*Draught*
17,000 tons	21,500 tons	717 feet	75½ feet	26 feet

Main guns	*Secondary guns*	*Anti-aircraft guns*	*Aircraft*	*Armour*
9–8 inch (3 triple)	12–5 inch dual purpose (6 twin)	16–3 inch (8 twin)	1 helicopter	8 inch side, 5 inch deck

Propelling machinery	*Shaft horse power*	*Boilers*	*Speed*	*Complement*
Geared steam turbines	120,000	4 Babcock & Wilcox	33 knots	1,500

Name	*Begun*	*Launched*	*Completed*	*Builders*	*Engineers*
DES MOINES	28 May 1945	27 Sept. 1946	17 Nov. 1948	Bethlehem Steel Co., Quincy	Builders
NEWPORT NEWS	1 Oct. 1945	6 Mar. 1947	29 Jan. 1949	Newport News S.B. & D.D. Co.	Builders
SALEM	4 June 1945	25 Mar. 1947	9 May 1949	Bethlehem Steel Co., Quincy	Builders



DES MOINES

ALBANY **CHICAGO** **COLUMBUS**

Of these three fully converted guided missile armed cruisers, the *Albany* was originally one of the "Oregon City" class of heavy cruisers with one funnel, while the *Chicago* and *Columbus* were both originally units of the "Baltimore" class of heavy cruisers with two funnels, but as both classes otherwise had similar dimensions, armament and propelling machinery and as all three ships have been rebuilt to the same design they now constitute a homogeneous new class of a unique type. The ships were stripped down to the main deck and building to a recast layout then started afresh. The reconstruction consisted of the entire suppression of the old conception of armament and separate funnels and masts, and the installation of guided missiles both forward and aft with combined mast-stacks, or "macks", replacing the former masts and stacks. In previous conversions, such as those of *Boston* and *Canberra*, see later page, conventional armament was retained forward while missile launchers were installed aft. *Albany* was the first conventionally powered ship to have all her guns replaced by missiles.

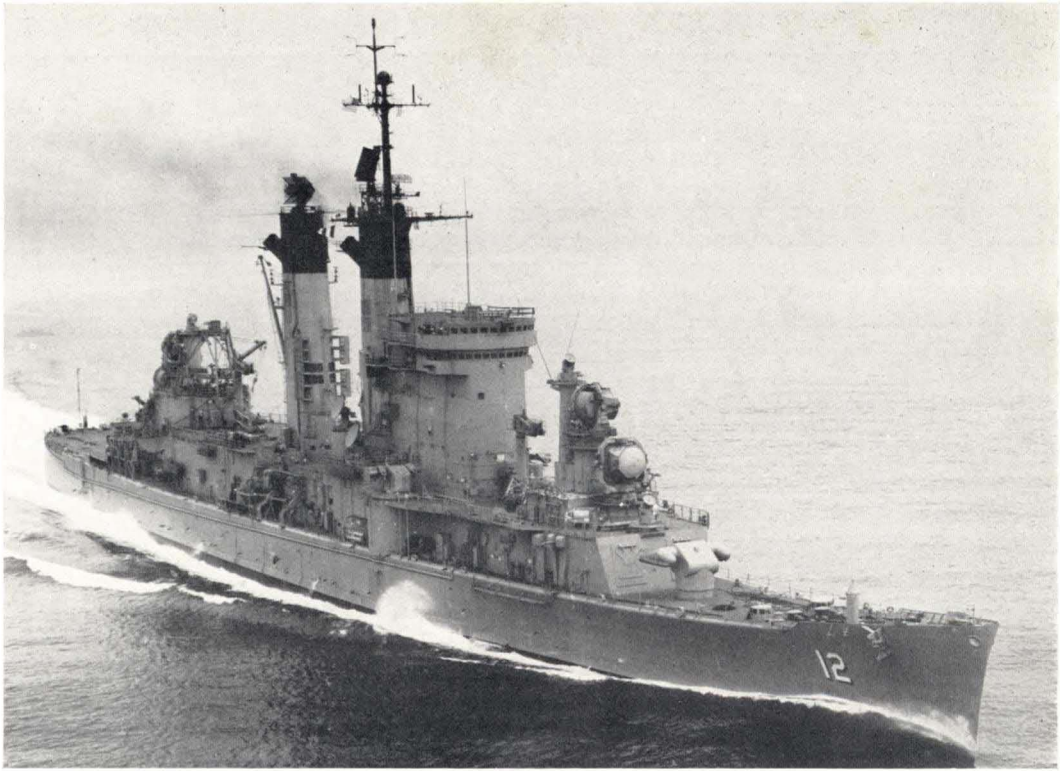
Standard displacement	*Full load displacement*	*Length*	*Beam*	*Draught*
13,700 tons	17,500 tons	673½ feet	71 feet	27 feet

Guided weapons	*Anti-submarine weapons*	*Aircraft*
2 twin launchers for "Talos" missiles (1 for'd, 1 aft)	1 octuple	1
2 twin launchers for "Tartar" missiles (1 port, 1 starb'd)	rocket launcher	helicopter

Propelling machinery	*Shaft horse power*	*Boilers*	*Speed*	*Complement*
Geared steam turbines	120,000	4 Babcock & Wilcox	34 knots	1,070

Name	*Begun*	*Launched*	*Completed*	*Builders*	*Converted*	*By*
ALBANY	6 Mar. 1944	30 June 1945	15 June 1946	Bethlehem Steel	Jan. 59–Nov. 62	Boston N.S.Y.
CHICAGO	28 July 1943	20 Aug. 1944	10 Jan. 1945	Philadelphia N.Y.	July 59–Aug. 63	S. Fr'co N.S.Y.
COLUMBUS	28 June 1943	30 Nov. 1944	8 June 1945	Bethlehem Steel	June 59–Dec. 62	Puget S.N.S.Y.

COLOMBUS



OREGON CITY **ROCHESTER**

The forerunners of the "Des Moines" class cruisers, these ships incorporate the results of the lessons learned during the earlier period of the war in the Pacific, as evidenced by the numerically great close range anti-aircraft battery and the arrangements made to control it. The single funnel was adopted to keep as much deck as possible clear for anti-aircraft mountings and also to ensure a clear field of fire. *Rochester* was refitted with the new 3-inch anti-aircraft guns in place of her former 40-mm. and 20-mm. anti-aircraft weapons. This is standard replacement procedure in all American warships now, as these smaller pieces are considered to be inadequate. As in all American ships, catapults and fixed-wing aircraft are being discarded in favour of helicopters as vessels are refitted for operational service. *Oregon City*, in reserve, retains her original armament. *Albany*, the third ship of this class, was fully converted into a guided-missile cruiser (see previous page).

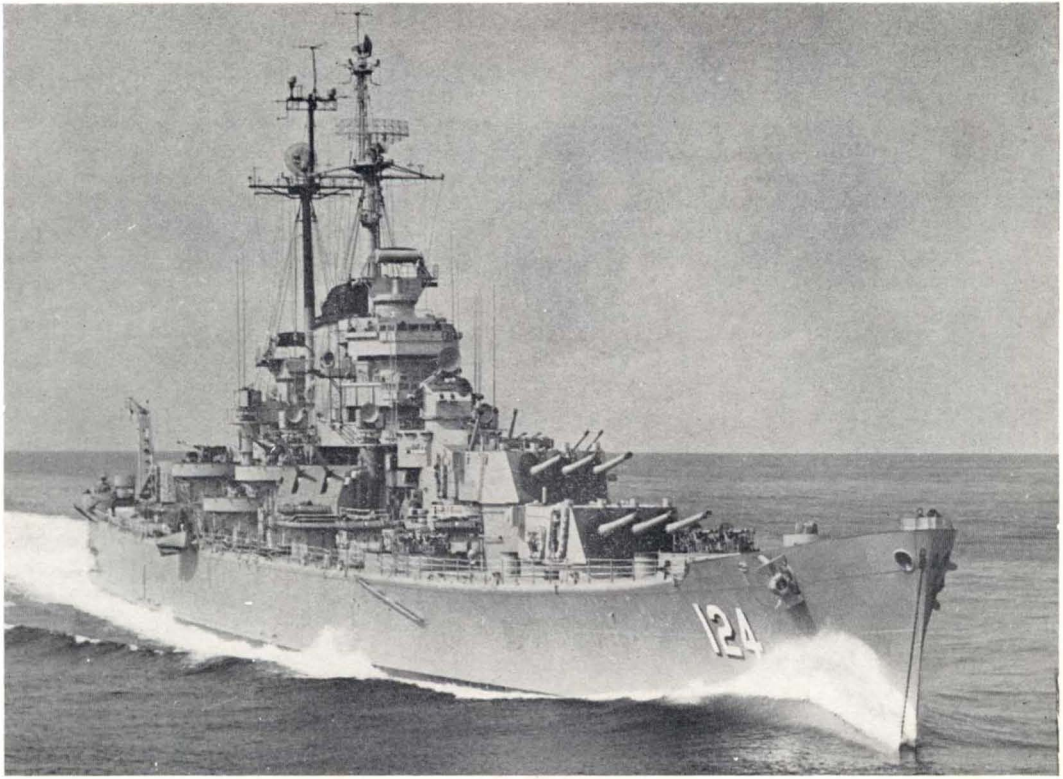
Standard displacement	*Full load displacement*	*Length*	*Beam*	*Draught*
13,700 tons	17,500 tons	673½ feet	71 feet	26 feet

Main guns	*Secondary guns*	*Anti-aircraft guns*	*Aircraft*	*Armour*
9–8 inch	12–5 inch	52–40 mm., 24–20 mm. (*Oregon City*) 20–3 inch (*Rochester*)	1 helicopter	6 inch side, 5 inch deck

Propelling machinery	*Shaft horse power*	*Boilers*	*Speed*	*Complement*
Geared steam turbines (General Electric)	120,000	4 Babcock & Wilcox	33 knots	1,262

Name	*Begun*	*Launched*	*Completed*	*Builders*	*Engineers*
OREGON CITY	8 Apr. 1944	9 Apr. 1945	16 Feb. 1946	Bethlehem Steel Co.	Builders
ROCHESTER	29 May 1944	28 Aug. 1945	20 Dec. 1946	Bethlehem Steel Co.	Builders

ROCHESTER



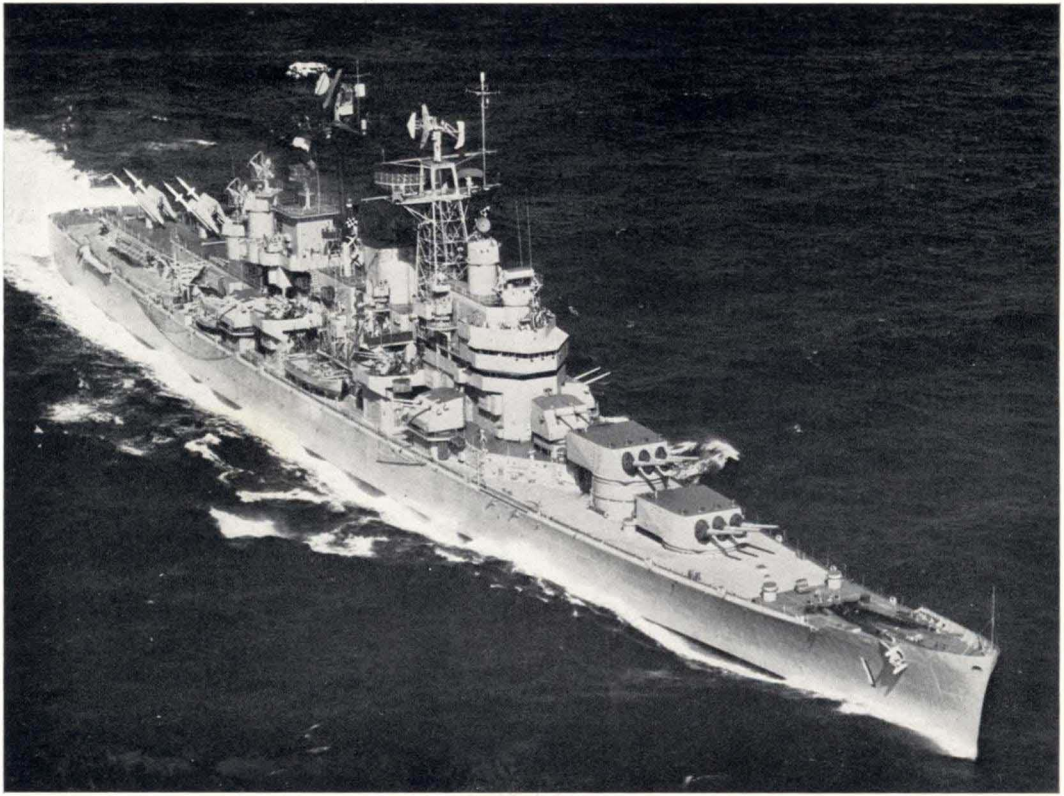
BOSTON **CANBERRA**

These two ships, originally built as heavy cruisers, were converted into the world's first guided missile cruisers, and they were the first operational combat ships capable of firing supersonic anti-aircraft guided missiles. With their associated radars and guidance systems for the "Terrier" and other anti-aircraft weapons these ships embodied a completely new naval weapons system specifically designed to further the United Stated Navy's policy of countering aircraft. During conversion the after 8-inch triple gun turret and the after 5-inch twin gun mounting were removed and two twin guided missile launchers were installed on "X" and "Y" positions in their place. Both ships also underwent other drastic changes to render them capable of fulfilling their new role of defence against aircraft. The superstructure was entirely remodelled to accommodate the new weapons. One of the original two funnels was removed, vastly altering the appearance of the vessels. The name *Canberra* is a departure from the usual system of nomenclature in United States cruisers: originally named *Pittsburgh*, just before completion she was re-named in commemoration of an Australian cruiser, H.M.A.S. *Canberra*, which was sunk in the First Battle of Savo Island on 9 August 1942.

Standard displacement	*Full load displacement*	*Length*	*Beam*	*Draught*
13,300 tons	17,500 tons	673½ feet	71 feet	26 feet
Guided weapons	*Main guns*	*Secondary guns*	*Anti-aircraft guns*	*Armour*
2 twin launchers for "Terrier" weapons (aft)	6–8 inch (2 triple) forward	10–5 inch (5 twin)	12–3 inch (6 twin)	6 inch side 3 inch decks
Propelling machinery	*Shaft horse power*	*Boilers*	*Speed*	*Complement*
Geared steam turbines	120,000	4 Babcock & Wilcox	34 knots	1,300

Name	*Begun*	*Launched*	*Completed*	*Builders*	*Converted*	*By*
BOSTON	30 June 1941	26 May 1942	30 June 1943	Bethlehem Steel	1953–1 Nov. 1955	New York S.B. Corp.
CANBERRA	3 Sept. 1941	19 Apr. 1943	14 Oct. 1943	Bethlehem Steel	1953–15 June 1956	New York S.B. Corp.

BOSTON

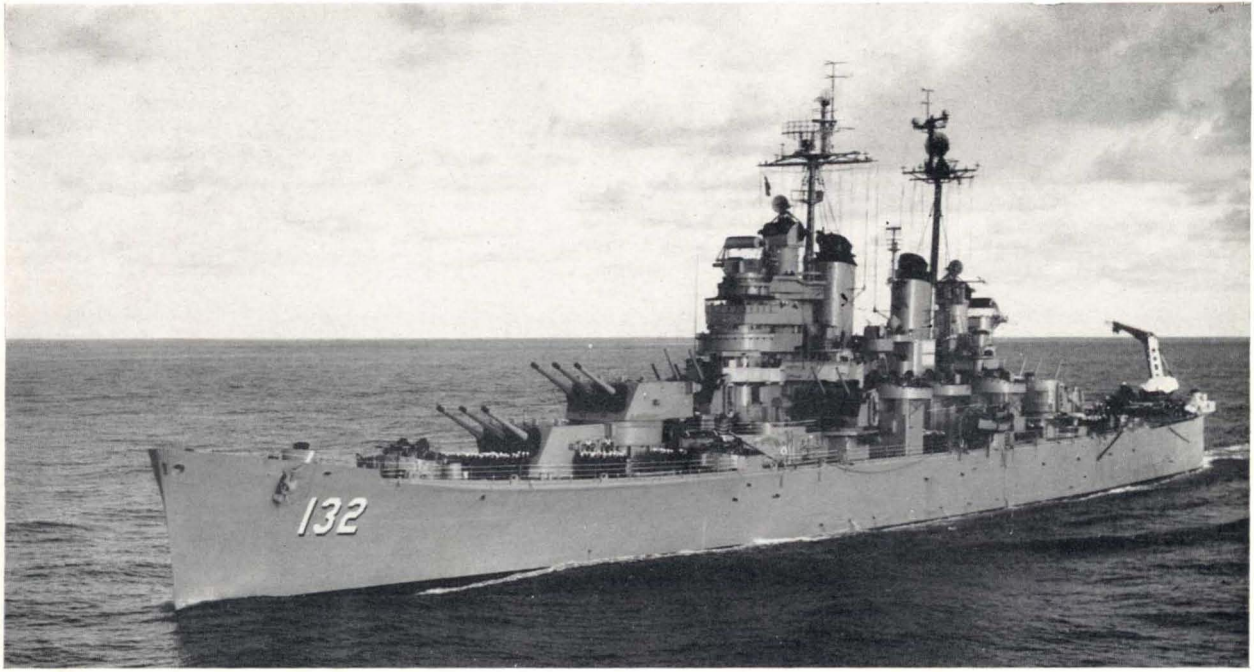


BALTIMORE **FALL RIVER** **LOS ANGELES** **PITTSBURGH** **ST. PAUL**
BREMERTON **HELENA** **MACON** **QUINCY** **TOLEDO**

The standard American heavy cruiser of the Second World War. A number of other hulls of this class were converted into aircraft carriers prior to their launch. Two ships, *Boston* and *Canberra*, had their after turrets removed and replaced by "Terrier" guided-missile launchers in 1955–56 (see previous page). *Helena*, *Los Angeles*, *Macon* and *Toledo* were fitted to carry "Regulus" guided missiles, but with little change in previous armament and they are not classed as guided missile cruisers. In all active units 40-mm. mounts are replaced by twenty 3-inch guns in twin mounts. Two other ships of this class were taken in hand for complete conversion to guided-missile cruisers in 1959, namely *Chicago* and *Columbus* (see page 58). They have "Talos" surface-to-air missiles mounted in twin launchers fore and aft and "Tartar" launchers installed amidships. "Regulus" surface-to-surface guided-missile launchers can be installed as required.

Standard displacement	*Full load displacement*	*Length*	*Beam*	*Draught*
13,600 tons	17,200 tons	673½ feet	71 feet	26 feet
Main guns	*Secondary guns*	*Anti-aircraft guns*	*Aircraft*	*Armour*
9–8 inch	12–5 inch	52–40 mm. (20–3 inch in active units)	1 helicopter	6 inch side 5 inch deck
Propelling machinery	*Shaft horse power*	*Boilers*	*Speed*	*Complement*
Geared steam turbines	120,000	4 Babcock & Wilcox	34 knots	1,400

Note: Baltimore, Quincy, Pittsburgh, St. Paul and *Helena* were built by Bethlehem Steel Co., Quincy; *Bremerton, Fall River, Macon* and *Toledo* by New York Shipbuilding Corporation; *Los Angeles* by Philadelphia Navy Yard. All completed in order of names for each yard between April 1943 and October 1946.



MACON

ROANOKE **WORCESTER**

The largest American so-called "light" cruisers, these vessels reverted to the twin turret, unusual for American design. Armed with 6-inch guns they were, by Treaty definition, "light" cruisers even though in tonnage they surpass the majority of the world's heavy cruisers. Eight intended sisters to these ships were cancelled at the end of the last war, two actually having been commenced. The main armament is semi-automatic and can be used as an anti-aircraft battery. Gun layout, and indeed the general design of the ships, was the same as the "Juneau" class anti-aircraft cruisers for which they could easily be mistaken.

Standard displacement	*Full load displacement*	*Length*	*Beam*	*Draught*
14,700 tons	18,500 tons	679½ feet	70⅔ feet	25 feet

Main guns	*Secondary guns*	*Aircraft*	*Armour*	*Complement*
12–6 inch	24–3 inch (*Roanoke*) 18–3 inch (*Worcester*)	1 helicopter	6 inch side, 5 inch deck	1,170 (*Roanoke*) 1,033 (*Worcester*)

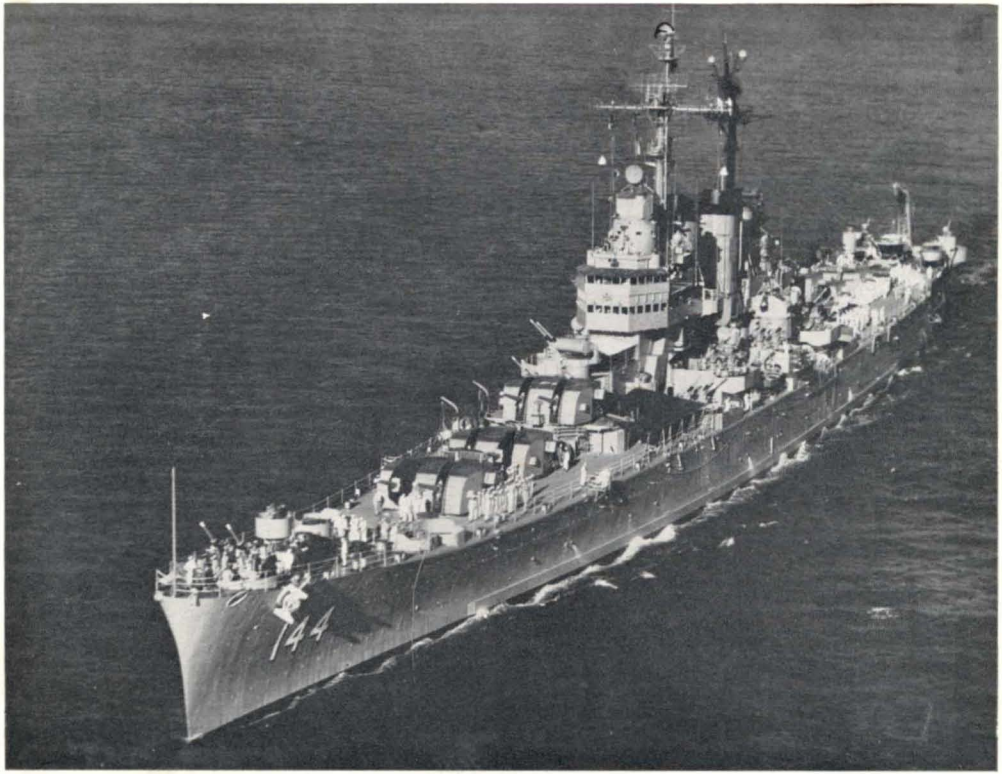
Propelling machinery	*Shaft horse power*	*Boilers*	*Speed*
Geared steam turbines (General Electric)	120,000	4 Babcock & Wilcox	32 knots

Name	*Begun*	*Launched*	*Completed*	*Builders and Engineers*
ROANOKE	15 May 1945	16 June 1947	4 Apr. 1948	New York Shipbuilding Corporation
WORCESTER	29 Jan. 1945	4 Feb. 1947	25 June 1948	New York Shipbuilding Corporation

Note: Of the two single funnelled large "light" cruisers of the "Fargo" class (see 1960 Edition, page 80), *Huntington* was stricken from the Navy List in 1961 and *Fargo* is out of commission in reserve.

Of the small anti-aircraft cruisers of the "Juneau" class (see 1960 Edition, page 84) *Oakland*, *Reno*, *San Diego* and *San Juan* were scrapped in 1959, and *Juneau* in 1960; and *Flint*, *Fresno*, *Spokane* and *Tucson* are out of commission in reserve.

WORCESTER



GALVESTON LITTLE ROCK OKLAHOMA CITY PROVIDENCE SPRINGFIELD TOPEKA

These six former so-called "light" cruisers of the "Cleveland" class (which were nevertheless big enough for some to be converted into aircraft carriers) were converted into guided missile cruisers. They have a conventional armament forward and amidships, and guided missile launchers aft, three being armed with "Talos" missiles and three with "Terrier" missiles. All are fitted with launchers for anti-submarine warfare torpedoes. *Little Rock*, *Oklahoma City*, *Providence* and *Springfield* were refitted as flagships, the navigating bridge and forward superstructure being reconstructed to provide for flag spaces and to include high frequency radio systems with side band capability. Other work, such as improvements in habitability, was also done in conjunction with the installation of missile capabilities. In appearance these ships vary considerably: *Galveston*, with two lattice masts differs from *Topeka* with a tripod foremast and lattice mainmast and mizzenmast; and both ships differ from *Providence* and *Springfield*, sister ships with three lattice masts, which again differ from *Little Rock* and *Oklahoma City* with two lattice masts.

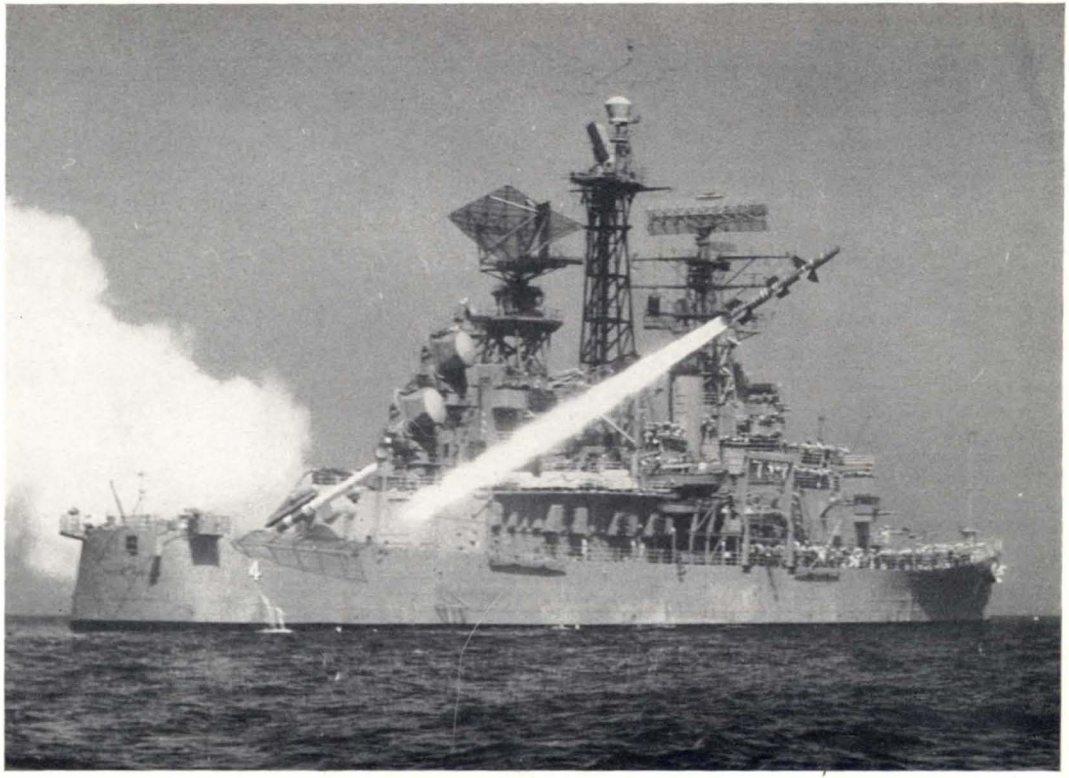
Standard displacement	*Full load displacement*	*Length*	*Beam*	*Draught*	*Armour*
10,670 tons	14,600 tons	610 feet	66 feet	25 feet	5 inch belts 5 inch decks

Guided weapons	*Main guns*	*Secondary guns*	*Anti-submarine weapons*
1 twin launcher aft for "Talos" missiles (*Gal., L.R., O.C.*) "Terrier" missiles (*Pro., Spr., Top.*)	6–6 inch (2 triple) *Galveston, Topeka* 3–6 inch (1 triple) *L.R., O.C., P.* and *S.*	6–5 inch (3 twin) *Galveston, Topeka* 2–5 inch (1 twin) *L.R., O.C., P.* and *S.*	Launchers for ASW torpedoes

Propelling machinery	*Shaft horse power*	*Boilers*	*Speed*	*Complement*
Geared steam turbines	100,000	4 Babcock & Wilcox	33 knots	1,070

Name	*Begun*	*Launched*	*Completed*	*Builders*	*Converted*	*By*
GALVESTON	20 Feb. 1944	22 Apr. 1945	25 May 1946	Cramp S.B. Co.	Aug. 56–Sept. 58	Philadelphia N.S.Y
LITTLE ROCK	6 Mar. 1943	27 Aug. 1944	17 June 1945	Cramp S.B. Co.	Jan. 57–June 60	New York S.B. Corp.
OKLAHOMA CITY	8 Mar. 1942	20 Feb. 1954	22 Dec. 1944	Cramp S.B. Co.	May 57–Sept. 60	Beth. S. Co. S. Fr'co.
PROVIDENCE	27 July 1943	28 Dec. 1944	15 May 1945	Bethlehem, Qu.	June 57–Sept. 59	Boston Naval S.Y.
SPRINGFIELD	13 Feb. 1943	9 Mar. 1944	8 Sept. 1944	Bethlehem, Qu.	Aug. 57–July 60	Beth. S. Co., Quincy
TOPEKA	21 Apr. 1943	19 Aug. 1944	23 Dec. 1944	Bethlehem, Qu.	Aug. 57–Mar. 60	New York N.S.Y.

LITTLE
ROCK



AMSTERDAM **ATLANTA** **PORTSMOUTH** **VINCENNES**
ASTORIA **PASADENA** **VICKSBURG** **WILKES-BARRE**

Although classed as light cruisers on account of their 6-inch guns, these ships are larger than many heavy cruisers of the pre-war era. Numerically the largest class ever ordered, 27 were completed as cruisers and nine were converted into aircraft carriers. Typically American in appearance; with raking pole masts and tall funnels set close together, they could be mistaken for the "Baltimore" class heavy cruisers in a hasty observation. In 1958–60 the *Galveston*, *Little Rock*, *Oklahoma City*, *Providence*, *Springfield* and *Topeka* (see previous page) were partially converted into guided-missile cruisers, with twin launchers aft.

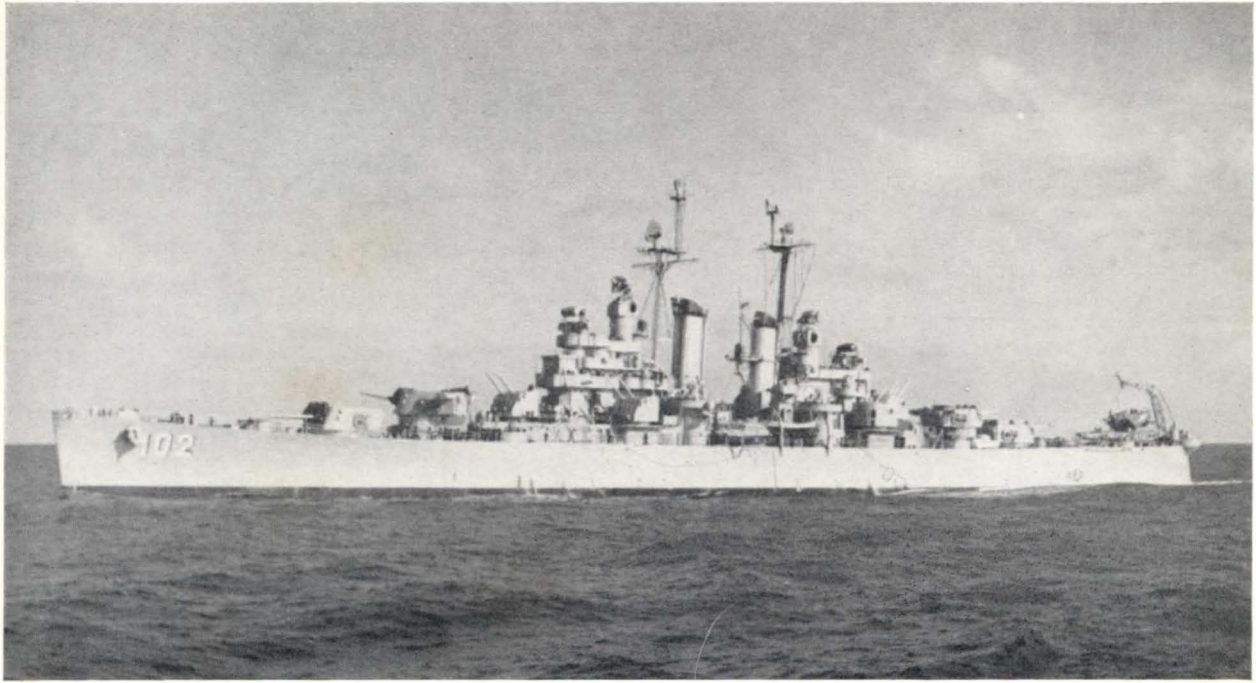
Standard displacement	*Full load displacement*	*Length*	*Beam*	*Draught*
10,500 tons	13,755 tons	610 feet	66 feet	25 feet

Main guns	*Secondary guns*	*Anti-aircraft guns*	*Armour*
12–6 inch	12–5 inch	24 to 28–40 mm., 19–20 mm.	5 inch side 3 inch deck

Propelling machinery	*Shaft horse power*	*Boilers*	*Speed*	*Complement*
Geared steam turbines (General Electric)	100,000	4 Babcock & Wilcox	33 knots	916

All vessels built between September 1941 and June 1945 by the New York Shipbuilding Corporation (*Wilkes-Barre* and *Atlanta*); Bethlehem Steel Co. (*Vincennes* and *Pasadena*); Cramp Shipbuilding Co. (*Astoria*); Newport News Co. (*Vicksburg*, *Amsterdam* and *Portsmouth*). Ships are named in sequence of completion by builders.

Note: Birmingham, *Cleveland*, *Columbia*, *Denver*, *Houston*, *Mobile*, *Montpelier* and *Santa Fe* of the above class were scrapped in 1959, *Dulath* and *Manchester* were stricken in 1960; and *Biloxi*, *Dayton* and *Miami* in 1961.



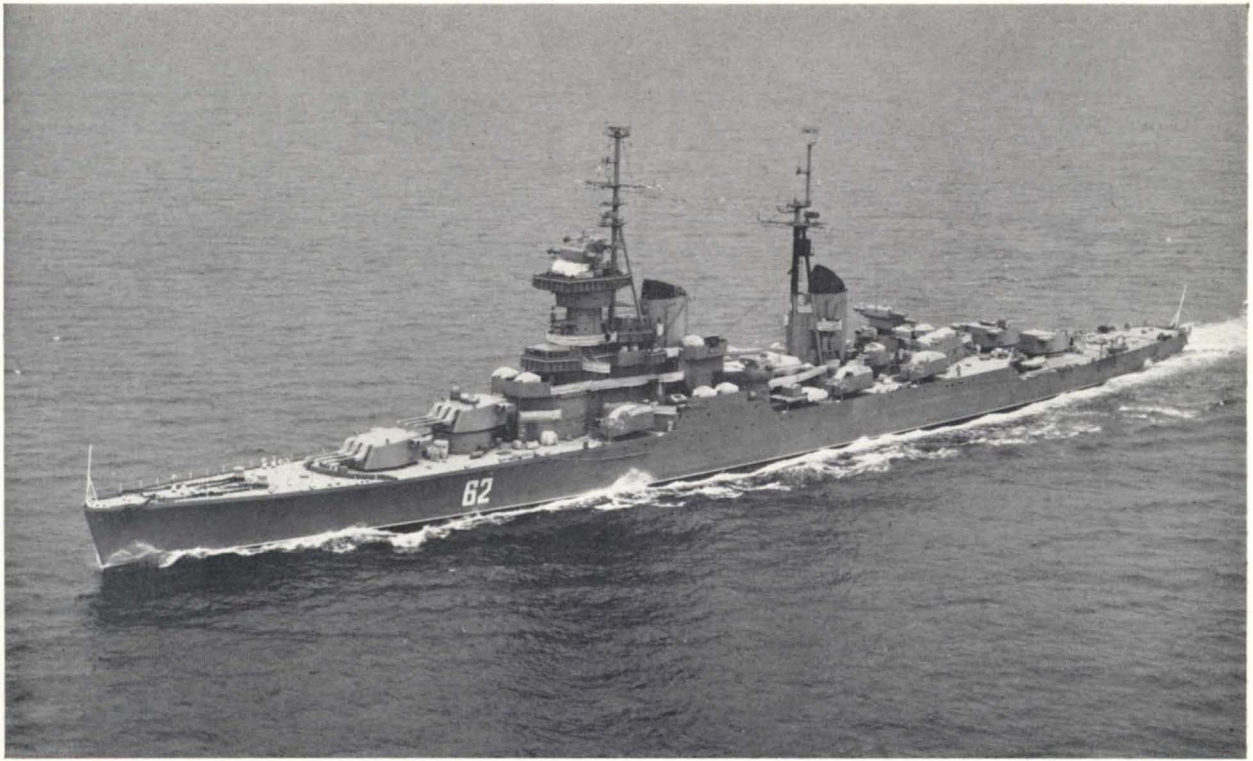
PORTSMOUTH

ADMIRAL LAZAREV
ADMIRAL NAKHIMOV
ADMIRAL SENJAVIN
ADMIRAL USHAKOV
ALEKSANDR NEVSKI
ALEKSANDR SUVOROV
DMITRI DONSKOI
DMITRI POZHARSKIY
DZERZHINSKI
KOSMA MININ
MIKHAIL KUTUSOV
OKTYABRSKAYA REVOLUTSIYA
PETROPAVLOVSK
SVERDLOV
VARYAG
ZHDANOV

Among the most modern and powerful cruisers afloat, little was known of these ships until 1953, when the *Sverdlov* attended the Coronation Review at Spithead, and one of her sisters paid a courtesy visit to Sweden. It is believed that seventeen vessels were launched from 1951 onwards. A few of the names given above are subject to confirmation, accurate information being difficult to obtain, and some ships may have been renamed. There is slight variation in later ships in the siting of the anti-aircraft mountings. There is an armour belt around the whole hull, of at least four-inch thickness. Two sets of mine rails are fitted on the quarterdeck. Guns are reported to be German models. The secondary armament turrets are very similar to the German 4·1-inch mounts with the guns mounted very far back in the turret and elevating in the roof rather than the turret face. To be distinguished from "Chapaev" class by break of forecastle deck being abaft the after superstructure, not abreast the forefunnel. All these ships were originally designed for a displacement of 12,800 tons standard and 17,000 tons full load. *Molotovsk* was renamed *Oktyabrskaya Revolutsiya* in 1957.

Standard displacement	*Full load displacement*	*Length*	*Beam*	*Draught*
15,450 tons	19,200 tons	689 feet	70 feet	24½ feet
Main guns	*Secondary guns*	*Anti-aircraft guns*	*Torpedo tubes*	*Mines*
12–6 inch	12–3·9 inch	32–37 mm.	10–21 inch	140 to 250
Propelling machinery	*Shaft horse power*	*Boilers*	*Speed*	*Complement*
Geared steam turbines	130,000	6	34·5 knots	1,050

Note: Of this class *Ordzhonikidze* was transferred to the Indonesian Navy in 1962 and renamed *Irian* and it was reported in 1963 that a second cruiser of the class is to be transferred to Indonesia.



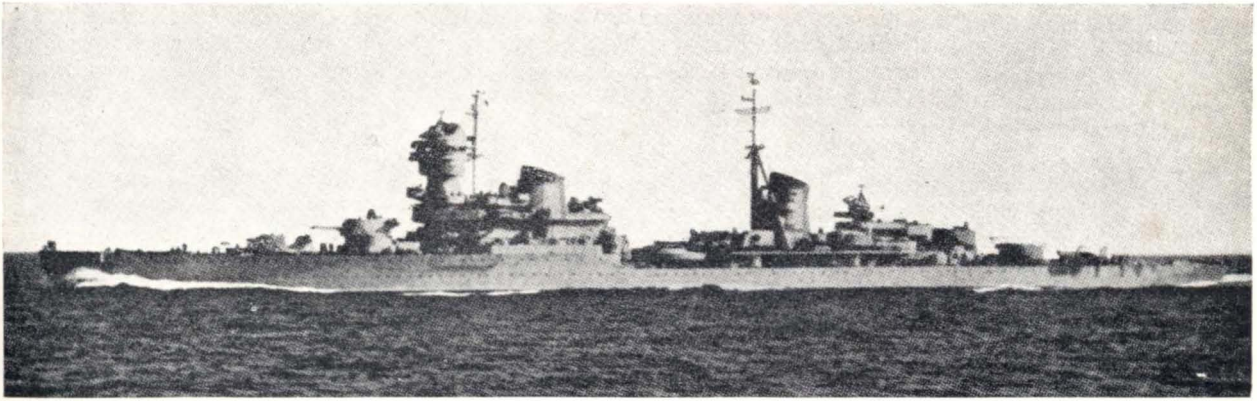
ZHDANOV

CHAPAEV **KOMSOMOLETS** **KUIBYSHEV** **ZHELESNYAKOV**

Designed as a logical development of the original "Kirov" type, the construction of these cruisers, begun in 1939–40, had to be stopped during the Second World War, and they were not resumed until 1946 and 1947. In several respects they resemble their successors of the "Sverdlov" class, but the forecastle deck level breaks just abaft the forefunnel instead of right aft at the quarter deck. They also have a somewhat more built-up appearance abaft the funnels which are vertical instead of raked as in the "Kirov" group. They were launched during 1941–47 and completed in 1948–50. The catapults originally mounted were subsequently removed from all the ships of this type. Their turret guns are in separate sleeves allowing the main armament independent elevation which is at least 50 degrees. The ships have a heavy director on the control tower, a pole foremast and a tripod mainmast forward of the after funnel. All this class have higher freeboard and taller funnels than the cruisers of the "Kirov" class. They have auxiliary diesel motors for cruising speeds in addition to the main geared steam turbines. *Chkalov* was reported to have been renamed *Komsomolets* in 1961.

Standard displacement	*Full load displacement*	*Length*	*Beam*	*Draught*
11,500 tons	15,000 tons	656 feet	$64\frac{3}{4}$ feet	21 feet
Main guns	*Secondary guns*	*Anti-aircraft guns*	*Mines*	*Armour*
12–6 inch	8–4 inch	28–37 mm.	100 to 200	Heavy side belt
Propelling machinery	*Shaft horse powe*	*Boilers*	*Speed*	*Complement*
Geared steam turbines and cruising diesels	113,000	6	35 knots	834

Note: A fifth ship of this class, *Frunse*, is reported to have been discarded for disposal. *Chapaev* is reported to have been dismantled in 1961.



ZHELEZNYAKOV

KIROV **KALININ** **MAKSIM GORKI** **SLAVA**

The first class of cruisers built for the Russian Navy since the Revolution, these ships are said to have been designed by Italian experts, a belief certainly not belied by their appearance. Actually falling into two groups of two ships, these vessels have similar armament and dimensions. Two sister ships were destroyed incomplete on the slip at the time of the German invasion and two were recently disposed of. One vessel at least has had a long refit, making her recognitionally similar to the later "Chapaev" and "Sverdlov" types. *Molotov* was reported to have been renamed *Slava* in 1962. Details of the surviving "Kirov" class ships are given below.

Standard displacement	*Full load displacement*	*Length*	*Beam*	*Draught*
8,800 tons	11,500 tons	626¾ feet	59 feet	20 feet
Main guns	*Secondary guns*	*Anti-aircraft guns*	*Torpedo tubes*	*Mines*
9–7.1 inch	8–4 inch	16–37 mm., 6–13 mm.	6–21 inch	60 to 90
Propelling machinery	*Shaft horse power*	*Boilers*	*Speed*	*Complement*
Geared steam turbines and cruising diesels	110,000	6 Yarrow or Normand	35 knots	734

Note: Voroshilov is reported to have been scrapped. *Kaganovitch* is reported to have been lent or leased by Russia to the Chinese Communist Navy. *Maksim Gorki* is reported to be disarmed and in a bad state. *Kalinin* and *Slava* are no more than training ships.

KIROV

COLBERT **DE GRASSE**

The *De Grasse*, ordered under the 1937 Estimates, was suspended during the German occupation of Lorient, but her construction was resumed in 1946 until her launch. Building then again stopped pending the study of new anti-aircraft equipment, and owing to financial stringency. Her construction was again continued on 9 January 1951, and she was completed to a modified design as an anti-aircraft cruiser in Brest Dockyard, with modern armament. She is equipped as a fleet command ship, and for the radar control of air strikes.

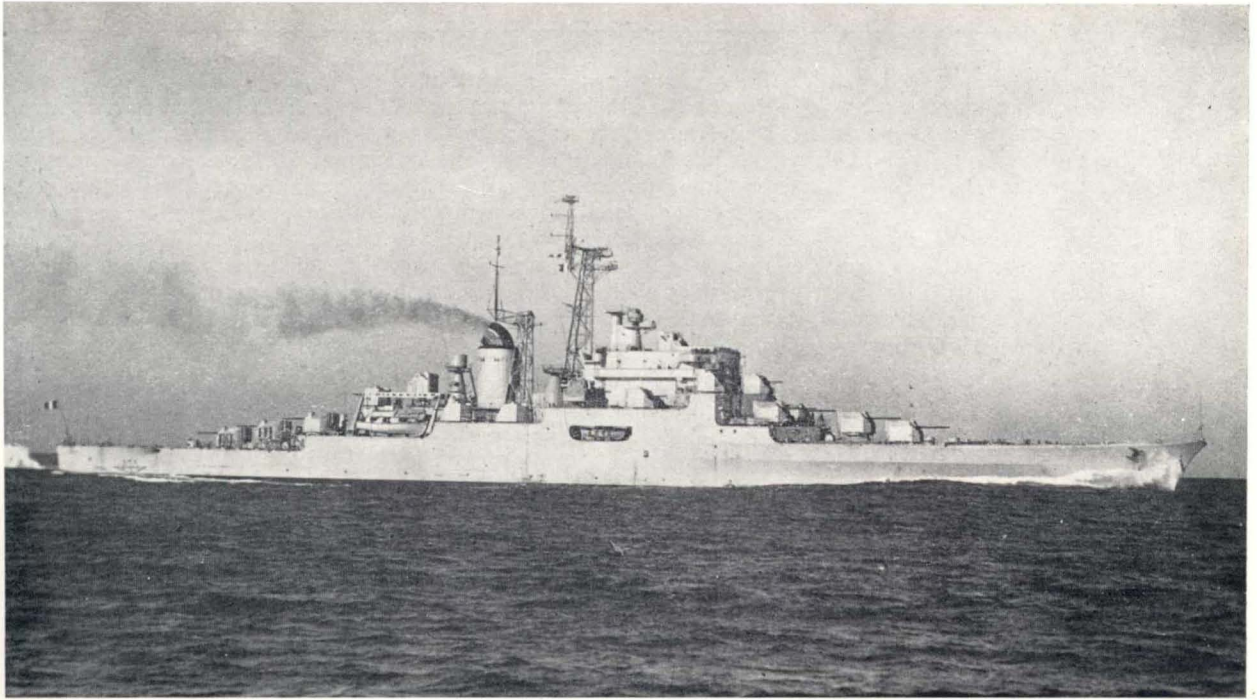
The *Colbert* is of an improved "De Grasse" type. Provision was made in her design so that she can be fitted eventually with guided missiles. She has a new scheme of protection, quite different from that of her half-sister, and has a platform for a helicopter. As a fast transport she could carry 2,400 officers and men with full equipment. Her guns are radar controlled with stabilised gunlayers for automatic tracking, and the two ships constitute a formidable anti-aircraft defence for a fleet or convoy.

Standard displacement	*Full load displacement*	*Length*	*Beam*	*Draught*
Colbert 8,720 tons	11,000 tons	597 feet	63½ feet	18¾ feet
De Grasse 9,380 tons	11,545 tons	617 feet	61 feet	18¼ feet

Main guns	*Secondary guns*	*Armour*	*Aircraft*	*Complement*
16–5 inch	20–57 mm.	4 inch side, 3 inch deck	1 helicopter	997
16–5 inch	12–57 mm.	(*De Grasse*)	(*Colbert*)	966

Propelling machinery	*Shaft horse power*	*Boilers*	*Speed*
Geared steam turbines	86,000	4	32 knots
Geared steam turbines	105,000	4	33·5 knots

Name	*Begun*	*Launched*	*Completed*	*Builders*	*Engineers*
COLBERT	Dec. 1953	42 Mar. 1956	5 May 1959	Brest Dockyard	Brest Dockyard
DE GRASSE	Nov. 1938	11 Sept. 1946	3 Sept. 1956	Lorient Dockyard	A. Ch. de Bretagne



COLBERT

GIUSEPPE GARIBALDI

The sole operational survivor of the once large Italian cruiser force, *Giuseppe Garibaldi* has been converted into a guided-missile cruiser with a twin "Terrier" launcher aft. Her appearance has been completely altered, with a single large trunked funnel (in place of two funnels) and lattice masts. She was commissioned for operational service in 1962. In addition to the guided weapons, the new armament includes four 5·3-inch dual purpose guns of a new fully automatic model disposed in two twin turrets forward, and an anti-aircraft battery of eight 3-inch fully automatic weapons, also of a new pattern, built by O.T.O. La Spezia, disposed in single turrets, four on each side amidships abreast the funnel and the bridge, with a rate of fire of 57 rounds per minute. On her original trials, when the ship was first built, she developed 104,030 shaft horse power and attained a speed of 33·6 knots. During her reconstruction her machinery has been completely refitted. She was originally a sister ship of the light cruiser *Luigi di Savoia Duca degli Abruzzi* which was removed from the effective list in 1961.

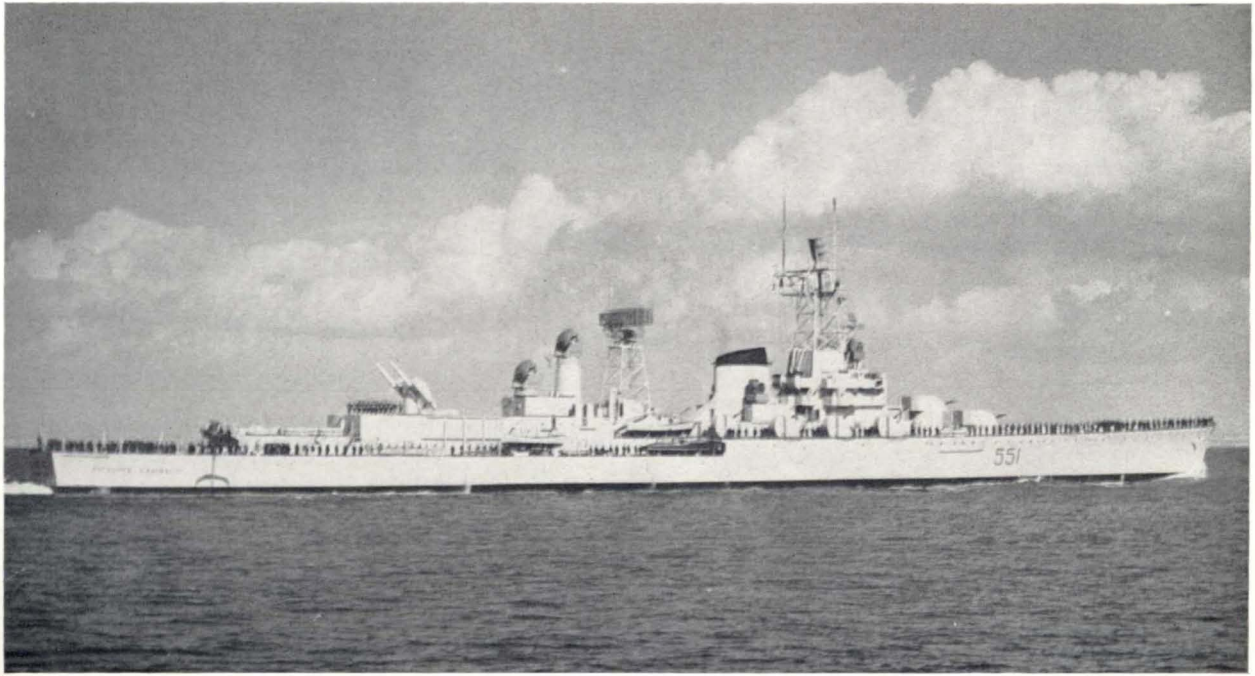
Standard displacement	*Full load displacement*	*Length*	*Beam*	*Draught*
9,802 tons	11,600 tons	613½ feet	61⅔ feet	29 feet

Main guns	*Anti-aircraft guns*	*Guided weapons*	*Armour*
4–5.3 inch (2 twin)	8–3 inch (single)	4 tubes aft for "Polaris" missiles 1 twin launcher aft for "Terrier" missiles	4½ inch side

Propelling machinery	*Shaft horse power*	*Boilers*	*Speed*	*Complement*
Geared steam turbines	85,000	6 of 3-drum type	30 knots	650

Name	*Begun*	*Launched*	*Completed*	*Builders*	*Converted*
GIUSEPPE GARIBALDI	Dec. 1933	21 Apr. 1936	Dec. 1937	C. R. dell' Adriatico	1957–1962

Note: The cadets' training cruiser *Raimondo Montecuccoli*, completed in 1935 (a ship similar to the light cruiser *Elli* in the Royal Hellenic Navy, described and illustrated on page 116 of the 1960 Edition) has a standard displacement of 7,675 tons, an overall length of 597¾ feet, a beam of 54½ feet and a draught of 29 feet, with a main armament of six 6-inch guns and a speed of 29 knots.



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GIUSEPPE GARIBALDI

DE RUYTER **DE ZEVEN PROVINCIEN**

Bearing the names of famous warships of the past, and, incidentally, that of one another, their names having been transposed, these ships represented the latest in European cruiser design. Laid down in 1939 the hulls of these ships were captured by the Germans and intermittent work continued. One, the present *De Ruyter*, was launched by the Germans, but as the *De Zeven Provincien*. The change of names and, indeed, the retention of the Dutch name was puzzling and unexplained. Somewhat American in design, the secondary armament is superimposed over the main armament. All guns are fully automatic and radar controlled. The remarkable combined mast and funnel design was unique among the world's cruisers. The mainmast was originally abaft the after funnel, but it was subsequently stepped before the after funnel, doubtless because heat and smoke affected the radar gear. The shape of the bow differs in the two ships, which accounts for the variations in the overall lengths. Plans are under official consideration to replace the after turrets of *De Zeven Provincieu* with guided-missile launching equipment.

Standard displacement	*Full load displacement*	*Length*	*Beam*	*Draught*
9,529 tons	11,850 tons	*De Ruyter* 614½ feet *De 7 Prov.* 609 feet	57 feet	22 feet

Main guns	*Secondary guns*	*Anti-aircraft guns*	*Armour*	*Complement*
8–6 inch	8–57 mm.	8–40 mm.	3 inch side	957 to 973

Propelling machinery	*Shaft horse power*	*Boilers*	*Speed*
Parsons geared steam turbines	85,000	4 of 3-drum type	32 knots

Name	*Begun*	*Launched*	*Completed*	*Builders*
DE RUYTER	5 Sept. 1939	24 Dec. 1944	18 Nov. 1953	Wilton-Fijenoord
DE ZEVEN PROVINCIEN	19 May 1939	22 Aug. 1950	17 Dec. 1953	Rotterdam D.D. Co.

DE ZEVEN PROVINCIEN

GÖTA LEJON **TRE KRONOR**

The Royal Swedish Navy's most modern heavy ships, these cruisers cannot be mistaken for any other ships, an enormous director on a box bridge, light tripod masts and very heavily raked, squat funnels being their recognition features. An unusual gun arrangement with a triple turret forward and two twin turrets aft also mark them out. The 6-inch guns are high angle anti-aircraft weapons with an elevation of 70 degrees and are automatic and dual purpose. Both ships now have an enclosed tower bridge structure. So large is the bridge in comparison to the forward turret that at a distance the ships do not seem to mount a forward armament. Fast, well-armed and modern, they were reconstructed and refitted in 1951–52, when the nine 25-mm. anti-aircraft pieces formerly mounted were suppressed and seven 40-mm. anti-aircraft guns added. *Göta Lejon* was modernised in 1958, with new radar and 57-mm. guns among other features.

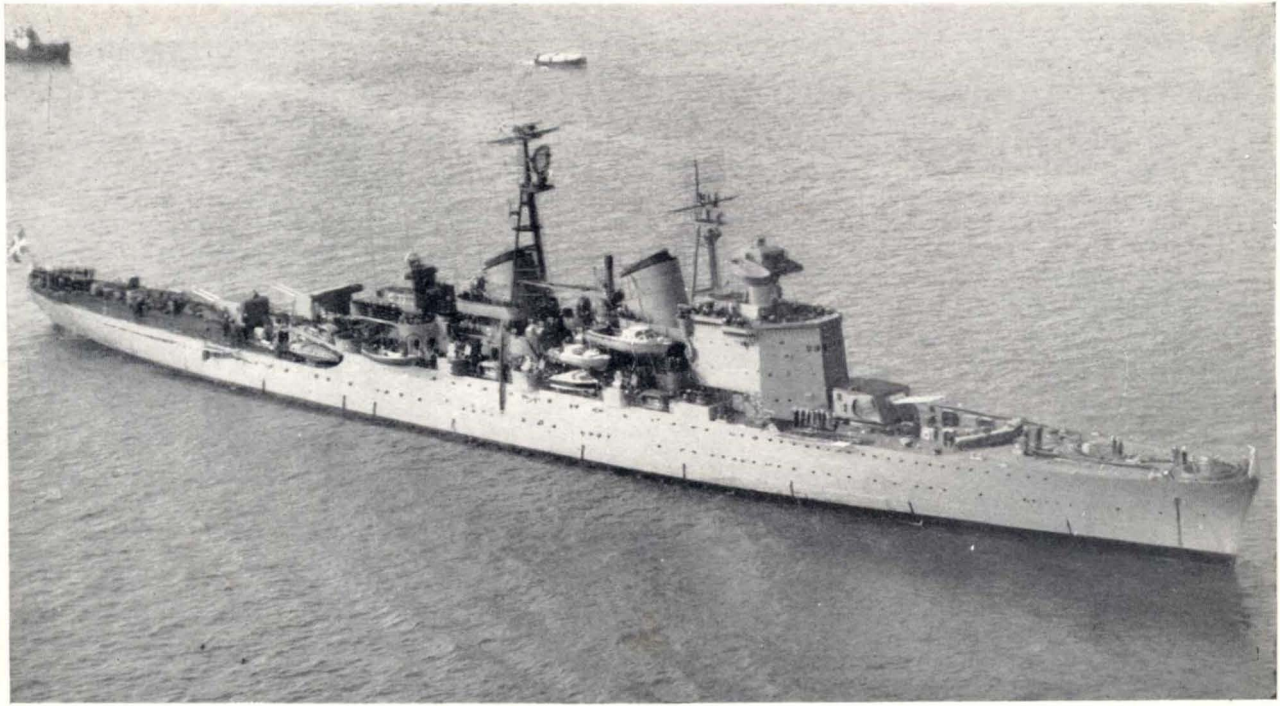
Standard displacement	*Full load displacement*	*Length*	*Beam*	*Draught*
8,200 tons	9,200 tons	597 feet	54 feet	21¾ feet

Main guns	*Anti-aircraft guns*	*Torpedo tubes*	*Mines*	*Armour*
7–6 inch	27–40 mm. (*Tre Kronor*) 4–57 mm.; 11–40 mm. (*Göta Lejon*)	6–21 inch	120	5 inch side

Propelling machinery	*Shaft horse power*	*Boilers*	*Speed*	*Complement*
De Laval geared steam turbines	100,000	4 of 4-drum type	33 knots	455

Name	*Begun*	*Launched*	*Completed*	*Builders*
GÖTA LEJON	27 Sept. 1943	17 Nov. 1945	15 Dec. 1947	Eriksberg, Göteberg
TRE KRONOR	27 Sept. 1943	16 Dec. 1944	18 Oct. 1947	Gotaverken, Göteberg

Note: The cadets' seagoing training cruiser *Gotland*, formerly an anti-aircraft cruiser, and before that a cruiser seaplane carrier, as she was designed (see 1960 Edition, page 96) was sold in 1961, it was officially stated.



GÖTA LEJON

CANARIAS

Designed by a former Director of Naval Construction in the Royal Navy, and projected on the basic pattern of the contemporary British heavy cruisers of the later "County" class, this ship, the largest in the Spanish Navy, is unique among the world's cruisers in that she reverted to a twenty-five-year-old design. From her launching until her refit in 1952–3 she was distinguished by an enormous single-trunked funnel, but she was rebuilt to her original design of twin funnels, a reversal of the usual procedure. Heavy turrets, massive bridge tower, and absence of funnel rake readily identify her. The maximum elevation of her 8-inch guns is 70 degrees. She is named after the Canary Islands. *Baleares*, the sister ship of *Canarias*, was a casualty of the Spanish Civil War, having been torpedoed and sunk during a night action in March 1938.

Standard displacement	*Full load displacement*	*Length*	*Beam*	*Draught*
10,670 tons	12,230 tons	636 feet	64 feet	17½ feet

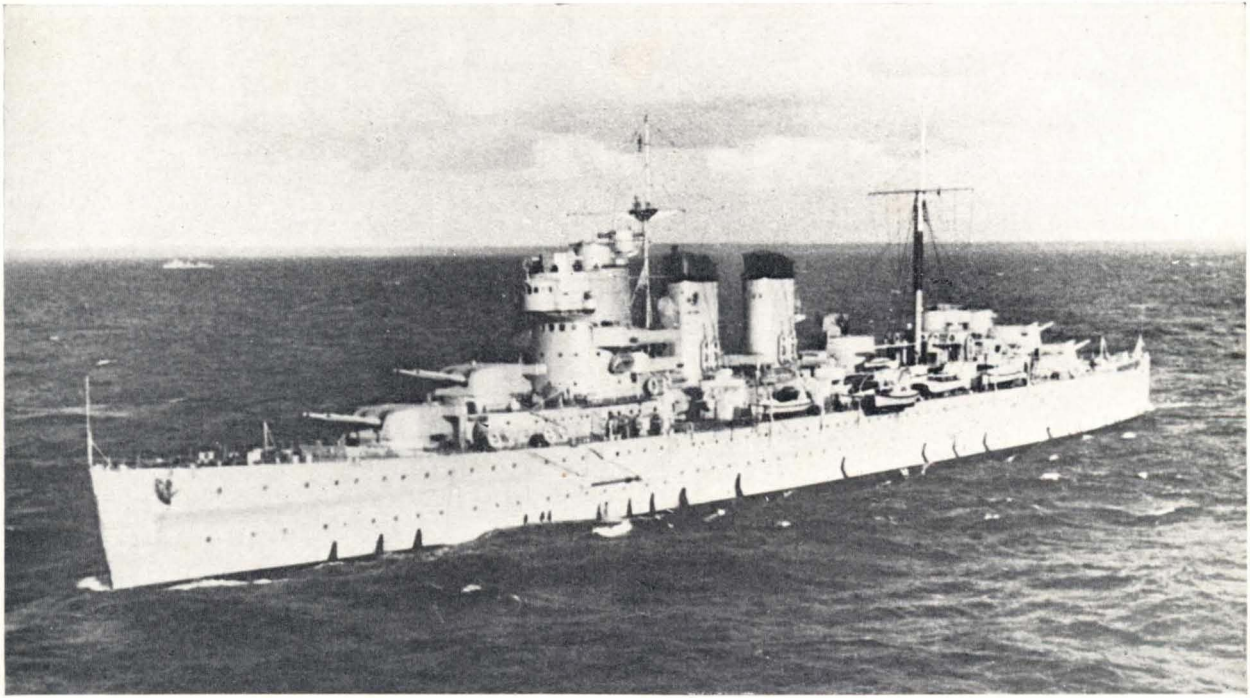
Main guns	*Secondary guns*	*Anti-aircraft guns*	*Torpedo tubes*	*Armour*
8–8 inch	8–4.7 inch	12–37 mm., 3–20 mm.	(12–21 inch removed)	2 inch side

Propelling machinery	*Shaft horse power*	*Boilers*	*Speed*	*Complement*
Geared steam turbines	90,000	8 Yarrow	33 knots	948

Name	*Begun*	*Launched*	*Completed*	*Builders*
CANARIAS	15 Aug. 1928	28 May 1931	Sept. 1936	Sociedad Espanola de Construccion Naval, Ferrol

Note: The light cruisers *Almirante Cervera*, *Galicia* and *Miguel de Cervantes* (see full particulars and photograph on pages 100 and 101 of the 1960 Edition), of 7,976 to 8,250 tons, completed in 1927–30, with a main armament of eight 6 inch guns and speeds of 31.6 to 34 knots, are over-age and obsolete and have been omitted from this issue.

The old anti-aircraft light cruiser *Mèndez Nuñez*, of 4,680 tons, completed in 1925, with a main armament of seven 4.7-inch anti-aircraft guns and a speed of 29 knots, is of no further military value.



CANARIAS

GENERAL BELGRANO **BARROSO** **O'HIGGINS**
NUEVE DE JULIO **TAMANDARE** **PRAT**

Formerly United States large light cruisers of the "Brooklyn" class, these ships are now the Argentinian *General Belgrano* (ex-17 *de Octubre*, ex-U.S.S. *Phoenix*) and 9 *de Julio* (ex-U.S.S. *Boise*), Brazilian *Barroso* (ex-U.S.S. *Philadelphia*) and *Tamandare* (ex-U.S.S. *St. Louis*) and Chilean *Prat* (ex-U.S.S. *Nashville*) and *O'Higgins* (ex-U.S.S. *Brooklyn*). All these ships were transferred in 1951 as part of a plan to strengthen South American navies. The ships are of somewhat unusual appearance, with a lattice tower between the funnels, a considerable gap between the after funnel and mainmast, and the third triple turret forward at main-deck level trained aft.

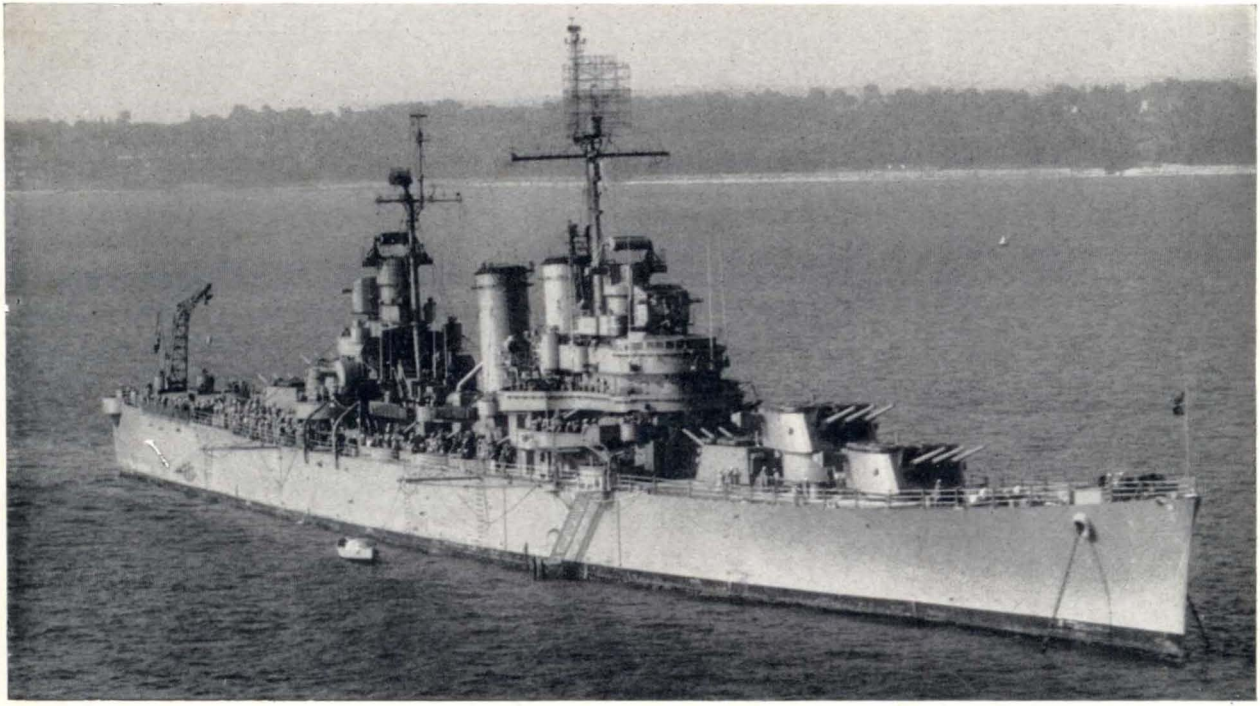
Standard displacement	*Full load displacement*	*Length*	*Beam*	*Draught*
9,700 to 10,800 tons	13,000 to 13,500 tons	608½ feet	69 feet	24 feet

Main guns	*Secondary guns*	*Anti-aircraft guns*	*Aircraft*	*Armour*
15–6 inch	8–5 inch	28–40 mm., 16 to 24–20 mm.	2 helicopters	4 inch side, 5 inch deck

Propelling machinery	*Shaft horse power*	*Boilers*	*Speed*	*Complement*
Geared steam turbines	100,000	8 Babcock & Wilcox	32.5 knots	888 to 980

Name	*Begun*	*Launched*	*Completed*	*Builders and Engineers*
GENERAL BELGRANO	15 Apr. 1935	12 Mar. 1938	18 Mar. 1939	New York Shipbuilding Corp.
NUEVE DE JULIO	1 Apr. 1935	3 Dec. 1936	1 Feb. 1939	Newport News Shipbuilding Co.
BARROSO	28 May 1935	17 Nov. 1936	28 July 1938	Philadelphia Navy Yard
TAMANDARE	10 Dec. 1936	15 Apr. 1938	10 Dec. 1939	Newport News Shipbuilding Co.
O'HIGGINS	12 Mar. 1935	30 Nov. 1936	18 July 1938	New York Navy Yard
PRAT	24 Jan. 1935	2 Oct. 1937	25 Nov. 1938	New York Shipbuilding Corp.

Note: Argentina also has the training cruiser *La Argentina*, completed in 1939, with a displacement of 6,000 tons, a main armament of nine 6-inch guns, and a speed of 30 knots (see full particulars on page 102 of the 1960 Edition); but her two old heavy cruisers *Almirante Brown* and *Veinticinco de Mayo* were offered for sale, for scrap, in 1961.



BARROSO

ALMIRANTE GRAU **CORONEL BOLOGNESI**

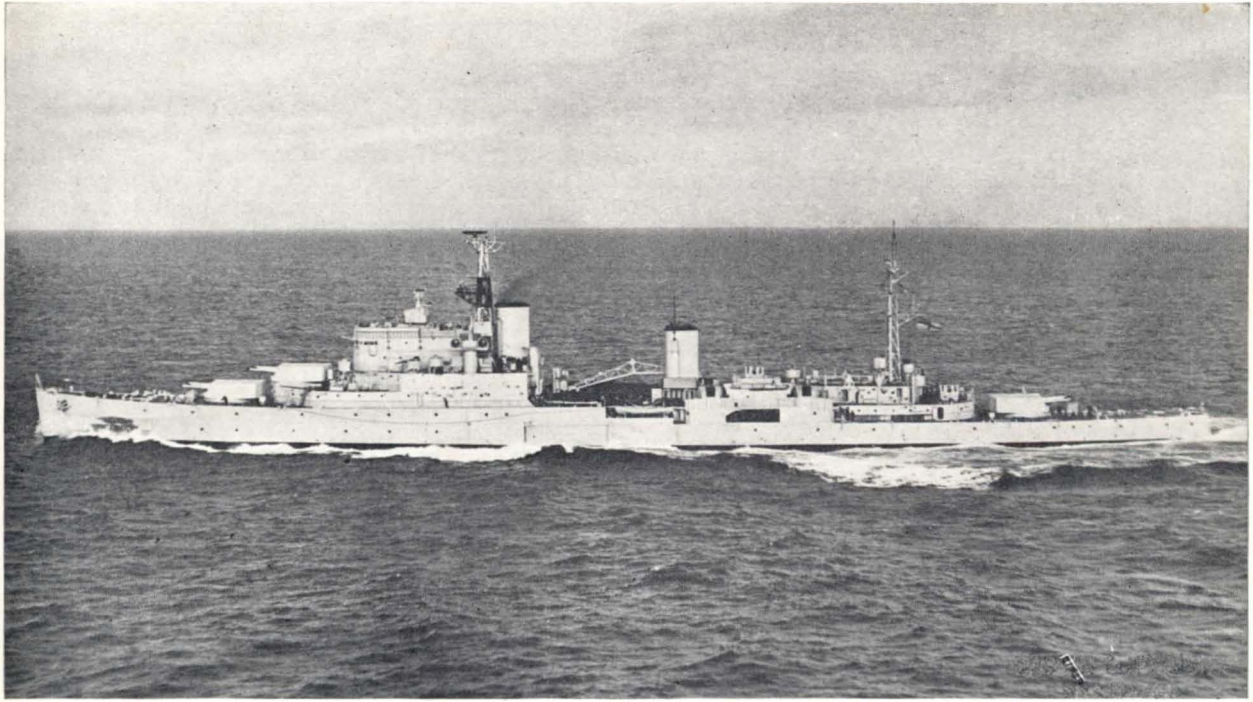
These two former British cruisers represent successive developments of the "Colony" class, with "X" turret suppressed and the anti-aircraft armament augmented. The *Newfoundland* was fitted with two new pattern lattice masts, but the *Ceylon* was refitted with lattice foremast only and retained her tripod mainmast. The six torpedo tubes formerly mounted have been removed from both vessels. H.M.S. *Newfoundland* was purchased by the Peruvian Government and became their property on 2 Nov. 1959. She was formally transferred to the Peruvian Navy at Portsmouth on 30 Dec. 1959 and renamed *Almirante Grau*. H.M.S. *Ceylon* was purchased by Peru (announced 18 Dec. 1959) and she was formally transferred to the Peruvian Navy at Portsmouth on 9 Feb. 1960 and renamed *Coronel Bolognesi*.

	Standard displacement	*Full load displacement*	*Length*	*Beam*	*Draught*
Almirante Grau:	8,800 tons	11,110 tons	555½ feet	62 feet	21 feet
Coronel Bolognesi:	8,781 tons	11,090 tons			

Main guns	*Secondary guns*	*Anti-aircraft guns*	*Armour*	*Complement*
9–6 inch	8–4 inch	18–40 mm. (*C.B.*)	4 inch	766 (*C.B.*)
		12–40 mm. (*A.G.*)		808 (*A.G.*)

Propelling machinery	*Shaft horse power*	*Boilers*	*Speed*
Geared steam turbines	72,500	4 Admiralty 3-drum type	31.5 knots

Name	*Begun*	*Launched*	*Completed*	*Builders*
ALMIRANTE GRAU	9 Nov. 1939	19 Dec. 1941	31 Dec. 1942	Swan, Hunter & Wigham Richardson, Wallsend-on-Tyne
CORONEL BOLOGNESI	27 Apr. 1939	30 July 1942	13 July 1943	Alex. Stephen & Sons, Ltd., Govan, Glasgow



ALMIRANTE GRAU

MYSORE

Formerly H.M.S. *Nigeria* of the British "Colony" class, her purchase from Great Britain for the Indian Navy was announced on 8 April, 1954. She underwent an extensive refit and conversion at the Birkenhead Shipyard of Cammell Laird & Co. Ltd., before commissioning for operational service. The ship originally had four triple 6-inch turrets, two forward and two aft, and two tripod masts. During reconstruction her triple 6-inch turret in "X" position and her two triple banks of 21-inch torpedo tubes were removed and two lattice masts were stepped. Her bridge was modified as in the British *Newfoundland*, all electrical equipment was replaced, the propelling machinery was overhauled, and various parts of the ship extensively modified. The ship was formally handed over to the Indian Navy at Birkenhead and renamed *Mysore* on 29 Aug. 1957, and she is now the flagship of the Indian Navy.

Standard displacement	*Full load displacement*	*Length*	*Beam*	*Draught*
8,700 tons	11,040 tons	555½ feet	62 feet	21 feet

Main guns	*Secondary guns*	*Anti-aircraft guns*	*Armour*	*Complement*
9–6 inch	8–4 inch	12–40 mm.	4½ inch	730

Propelling machinery	*Shaft horse power*	*Boilers*	*Speed*
Geared steam turbines	72,500	4 Admiralty 3-drum type	31.5 knots

Name	*Begun*	*Launched*	*Completed*	*Builders*	*Engineers*
MYSORE	8 Feb. 1938	18 July 1939	20 Sept. 1940	Vickers-Armstrongs Ltd., Tyne	Parsons

Note: India also has the old light cruiser *Delhi* (ex-H.M.S. *Achilles*), completed in 1933, with a displacement of 7,114 tons, a main armament of six 6-inch guns, and a speed of 32 knots (see full particulars and photograph on pages 110 and 111 of the 1960 Edition).

MYSORE

ROYALIST

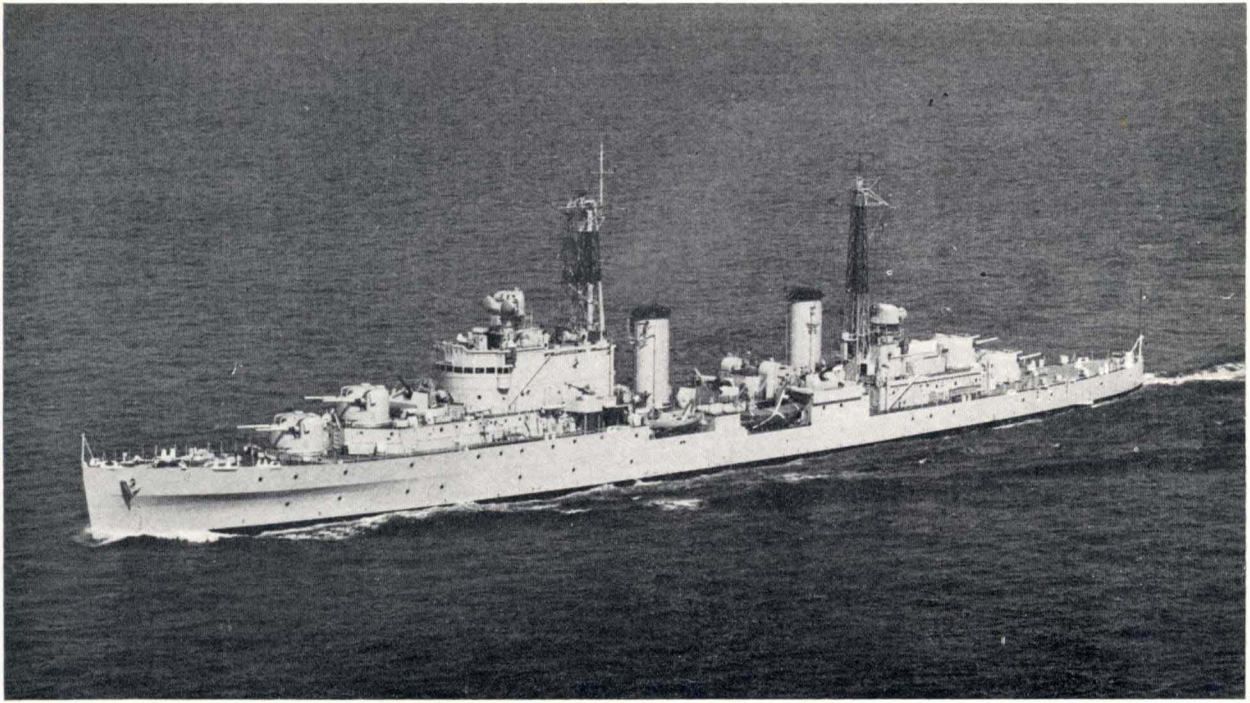
This light cruiser was lent by the Admiralty to the New Zealand Government, who pay for her annual maintenance. *Royalist* completed an extensive refit in Devonport Dockyard, where she was formally handed over to the Royal New Zealand Navy on 9 July 1956. She has a new bridge of rounded form, new lattice masts, the latest gun direction equipment, and air and surface radar. She was flagship of the Royal New Zealand Navy, but now wears the broad pennant of the Senior Officer Afloat. *Black Prince*, which was transferred to the Royal New Zealand Navy in 1946, was scrapped in 1962. Both ships belonged to the Improved "Dido" class of five anti-aircraft light cruisers, of which the *Bellona* (on loan to the Royal New Zealand Navy from 1946 to 1955 after which she was relieved by the *Royalist*) was scrapped in 1959, the *Diadem* was transferred to Pakistan and renamed "Babur" in 1957, and the *Spartan* was lost during the Second World War. The funnels and masts of the Improved "Didos", unlike the original "Didos", have no rake.

Standard displacement	*Full load displacement*	*Length*	*Beam*	*Draught*
5,900 tons	7,360 tons	512 feet	52 feet	18½ feet

Main guns	*Anti-aircraft guns*	*Torpedo Tubes*	*Armour*
8–5.25 inch dual purpose	8–40 mm.	(6–21 inch removed)	2 inch

Propelling machinery	*Shaft horse power*	*Boilers*	*Speed*	*Complement*
Geared steam turbines	62,000	4 Admiralty 3-drum type	32 knots	550

Name	*Begun*	*Launched*	*Completed*	*Builders*
ROYALIST	21 May 1940	30 May 1942	10 Sept. 1943	Scotts' S.B. & Eng. Co., Ltd., Greenock



ROYALIST

BABUR

This ship, formerly H.M.S. *Diadem* of the Royal Navy, is one of the anti-aircraft light cruisers built under the Second World War estimates. The Admiralty announced the sale of the vessel to Pakistan on 29 February 1956. She was refitted in H.M. Dockyard, Portsmouth, in 1957 with new radar, two whip aerials on the bridge and revised secondary armament, and she was officially turned over to the Pakistan Navy at Portsmouth on 5 July 1957 and renamed *Babur* after the founder of the great Mogul Empire (Diadem means the emblem of sovereignty). She was converted into a cadet training ship in 1961. She belonged to the Improved "Dido" class of which *Royalist* is in the Royal New Zealand Navy, *Bellona* was scrapped in 1959, *Black Prince* was scrapped in 1962, and *Spartan* was a Second World War loss. (Of the eleven ships of the original "Dido" class, *Bonaventure*, *Charybdis*, *Hermione* and *Naiad* were Second World War losses, *Scylla* was broken up in 1950, *Argonaut*, *Phoebe* and *Sirius* were scrapped in 1955–56, and *Cleopatra*, *Dido* and *Euryalus* went to the ship-breakers in 1958–59.)

Standard displacement	*Full load displacement*	*Length*	*Beam*	*Draught*
5,900 tons	7,560 tons	512 feet	52 feet	18½ feet

Main guns	*Anti-aircraft guns*	*Torpedo tubes*	*Armour*
8–5.25 inch dual purpose	14–40 mm.	6–21 inch (tripled)	2 inch

Propelling machinery	*Shaft horse power*	*Boilers*	*Speed*	*Complement*
Geared steam turbine	62,000	4 Admiralty 3-drum type	32 knots	588

Name	*Begun*	*Launched*	*Completed*	*Builders* and *Engineers*
BABUR	15 Nov. 1939	26 Aug. 1942	6 Jan. 1944	R. & W. Hawthorn Leslie & Co., Ltd., Hebburn-on-Tyne

G BABUR

DEVONSHIRE FIFE GLAMORGAN HAMPSHIRE KENT LONDON

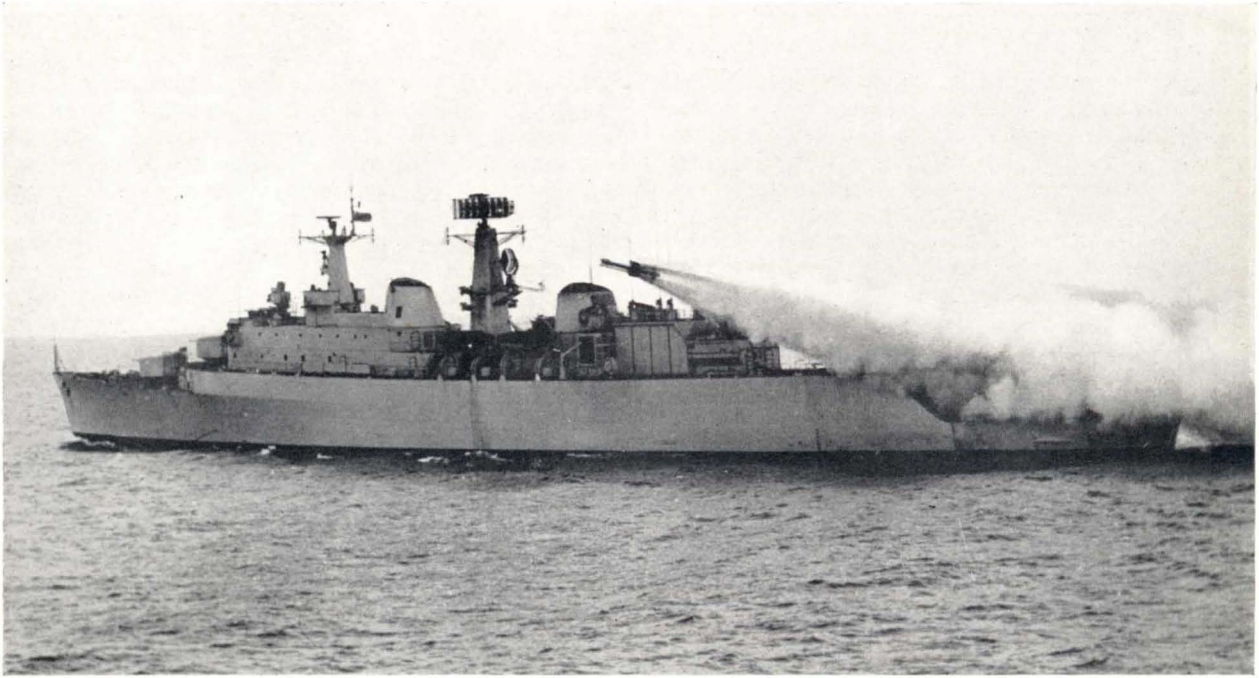
These ships were projected as fleet escorts and designed to embody the latest developments in the destroyer field. It was subsequently found possible to equip them with guided weapons instead of with anti-aircraft guns. They eventually materialised as an entirely new design and have turned out to be of so novel a type, stemming from but far in advance of and considerably bigger than destroyers, as to constitute a new category. They each carry a helicopter, armed with two homing torpedoes, which is served by a hangar and flight apron at the after end of the upper deck. Each shaft set of the twin screw main propulsion plant consists of a high pressure and low pressure steam turbine of 15,000 s.h.p. combined output plus two gas turbines each developing 7,500 s.h.p. Of handsome and symmetrical appearance, their construction and layout reflect great ingenuity.

Standard displacement	*Full load displacement*	*Length*	*Beam*	*Draught*
5,200 tons	6,200 tons	520½ feet	54 feet	20 feet

Guided missiles	*Guns*	*Aircraft*	*Complement*
1 twin launcher for "Seaslug" missiles 2 quadruple launchers for "Seacat" missiles	4–4.5 inch (2 twin)	Wessex Helicopter	440

Propelling machinery	*Shaft horse power*	*Boilers*	*Speed*
Geared steam turbines plus gas turbines	60,000	2 Babcock & Wilcox	32.5 knots

Name	*Begun*	*Launched*	*Completed*	*Builders*
DEVONSHIRE	9 Mar. 1959	10 June 1960	15 Nov. 1962	Cammell Laird & Co. Ltd., Birkenhead
FIFE	1 June 1962			Fairfield S.B. & E., Govan
GLAMORGAN	13 Sept. 1962			Vickers-Armstrongs, Tyne
HAMPSHIRE	24 Mar. 1959	16 Mar. 1961	15 Mar. 1963	John Brown, Clydebank
KENT	1 Mar. 1960	27 Sept. 1961	12 Aug. 1963	Harland & Wolff Ltd., Belfast
LONDON	26 Feb. 1960	7 Dec. 1961	22 Oct. 1963	Swan, Hunter, Wallsend



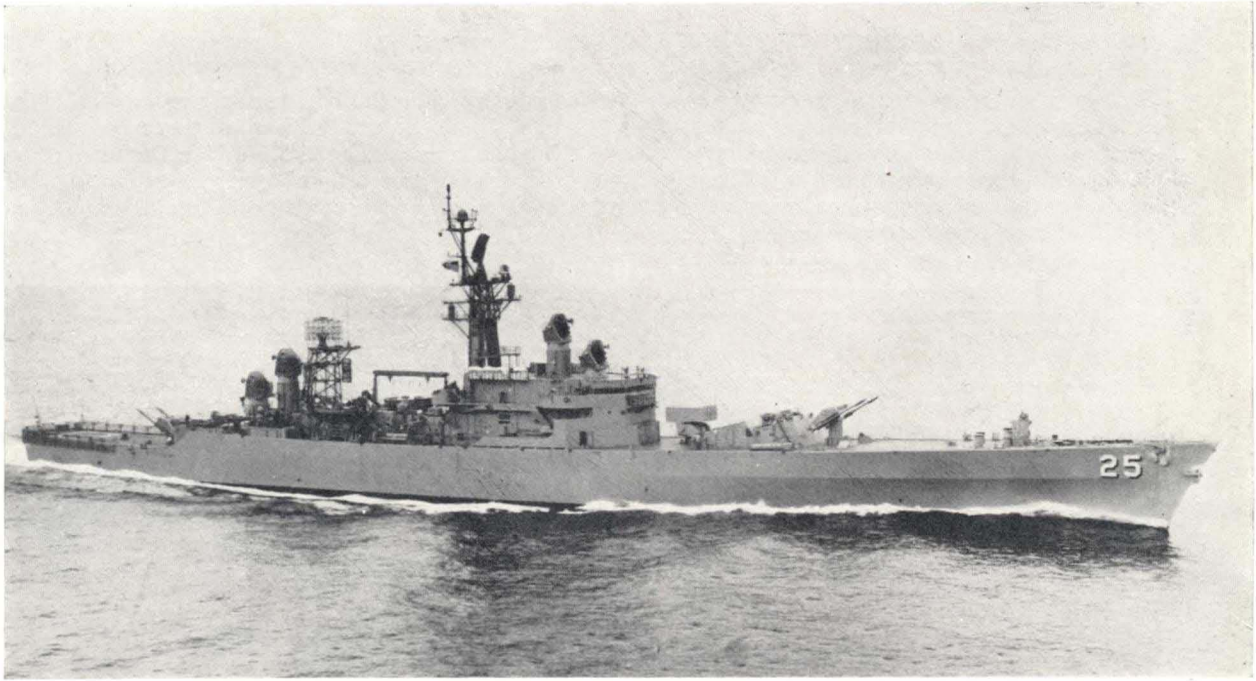
DEVONSHIRE

BAINBRIDGE

The world's first nuclear powered guided missile frigate, this remarkable prototype was built in the comparatively short time of less than $2\frac{1}{2}$ years. She is at once the largest warship of the destroyer type ever built (in the United States List of Naval Classifications she is placed under the generic destroyer category with the sub-classification of frigate) and the smallest surface warship to be nuclear powered. Her propulsion plant comprises two pressurised water cooled nuclear reactors generating steam for a two-shaft arrangement of geared turbines. The ship is capable of steaming 150,000 to 180,000 miles continuously at full power without refuelling, or 400,000 to 450,000 miles at 20 knots. The use of nuclear propulsion gives her many advantages. Among these are the tactical flexibility of steaming at high speeds for long periods without the necessity for refuelling and the elimination of funnels and air intakes for fans, providing great protection for personnel against the danger of atomic fall-out. Also the elimination of smoke stacks permits the use of better radar and communication antennae located for optimum performance and free from the deteriorating effects of stack fumes. The ship has a flight apron on the quarter deck for helicopter land on and take off. A similar but improved nuclear powered guided missile frigate, DLGN 35, is under construction, and a third but even bigger vessel of the type is projected.

Standard displacement	*Full load displacement*	*Length*	*Beam*	*Draught*
6,500 tons	7,600 tons	564 feet	58 feet	20 feet
Guided weapons	*Guns*	*Torpedo Tubes*	*Anti-submarine weapons*	*Aircraft*
2 twin launchers for "Terrier" missiles	2–3 inch anti-aircraft (twin)	6–21 inch	1 octuple rocket launcher	1 helicopter
Propelling machinery	*Shaft horse power*	*Nuclear reactors*	*Speed*	*Complement*
Geared steam turbines	60,000	2 of p.w.c. D I G type	30 knots	450

Name & No.	*Begun*	*Launched*	*Completed*	*Builders*	*Engineers*
BAINBRIDGE DLGN 25	15 May 1959	15 Apr. 1961	6 Oct. 1962	Bethlehem Steel Company, Quincy	General Electric Co. N.Y.



BAINBRIDGE

DALE **GRIDLEY** **HARRY E. YARNELL** **REEVES** **WORDEN**
ENGLAND **HALSEY** **LEAHY** **RICHMOND L. TURNER**

Very large guided missile armed destroyer leaders or frigates approaching the light cruiser category. The design is an enlargement and improvement on that of the "Coontz" class, compared with which they mount guided weapons both forward and aft instead of aft only. Taking into consideration their novel superstructure and layout they are quite symmetrical and good-looking vessels. They have combined mast-stacks or "macks" instead of the usual separate masts and stacks (funnels). They carry long range sonar and both long range and short range anti-submarine weapons.

Standard displacement	*Full load displacement*	*Length*	*Beam*	*Draught*
5,670 tons	7,000 tons	535 feet	53½ feet	17¼ feet

Guided weapons	*Guns*	*Torpedo tubes*	*Anti-submarine weapons*
2 twin launchers for "Terrier" missiles	4–3 inch anti-aircraft (2 twin)	6–21 inch	1 octuple rocket launcher (ASROC)

Propelling machinery	*Shaft horse power*	*Boilers*	*Speed*	*Complement*
Geared steam turbines	85,000	4	34 knots	400

Name	*No.*	*Begun*	*Launched*	*Completed*	*Builders*
DALE	DLG 19	6 Sept. 1960	28 July 1962		New York S.B. Corp.
ENGLAND	DLG 22	4 Oct. 1960	6 Mar. 1962		Todd Shipyards Corp.
GRIDLEY	DLG 21	15 July 1960	31 July 1961	25 May 1963	Puget Sound B. & D. Co.
HALSEY	DLG 23	25 Aug. 1960	15 Jan. 1962		San Francisco N.S.Y.
HARRY E. YARNELL	DLG 17	31 May 1960	9 Dec. 1961		Bath Iron Works Corp.
LEAHY	DLG 16	3 Dec 1959	1 July 1961	4 Aug. 1962	Bath Iron Works Corp.
REEVES	DLG 24	1 July 1960	12 May 1962		Puget Sound N.S.Y.
RICHMOND K. TURNER	DLG 20	9 Jan. 1961	6 Apr. 1963		New York S.B. Corp.
WORDEN	DLG 18	19 Sept. 1960	2 June 1962		Bath Iron Works Corp.

Note: Nine later vessels of the type will be larger than the "Leahy" class and will have a helicopter platform aft. Those named to date are *Belknap*, *Josephus Daniels*, *Jouett*, *Sterett* and *Wainwright*.

LEAHY

COONTZ **DEWEY** **KING** **MACDONOUGH** **PREBLE**
DAHLGREN **FARRAGUT** **LUCE** **MAHAN** **WILLIAM V. PRATT**

Guided-missile ships of the destroyer leader or large frigate category, these ten vessels are improved versions of the original destroyer leaders of the "Mitscher" type, afterwards re-rated as frigates. Designed to destroy air targets, these new ships of the "Coontz" class also have anti-submarine and airborne early-warning capabilities. They have a conventional battery forward and a twin "Terrier" guided-missile launcher aft.

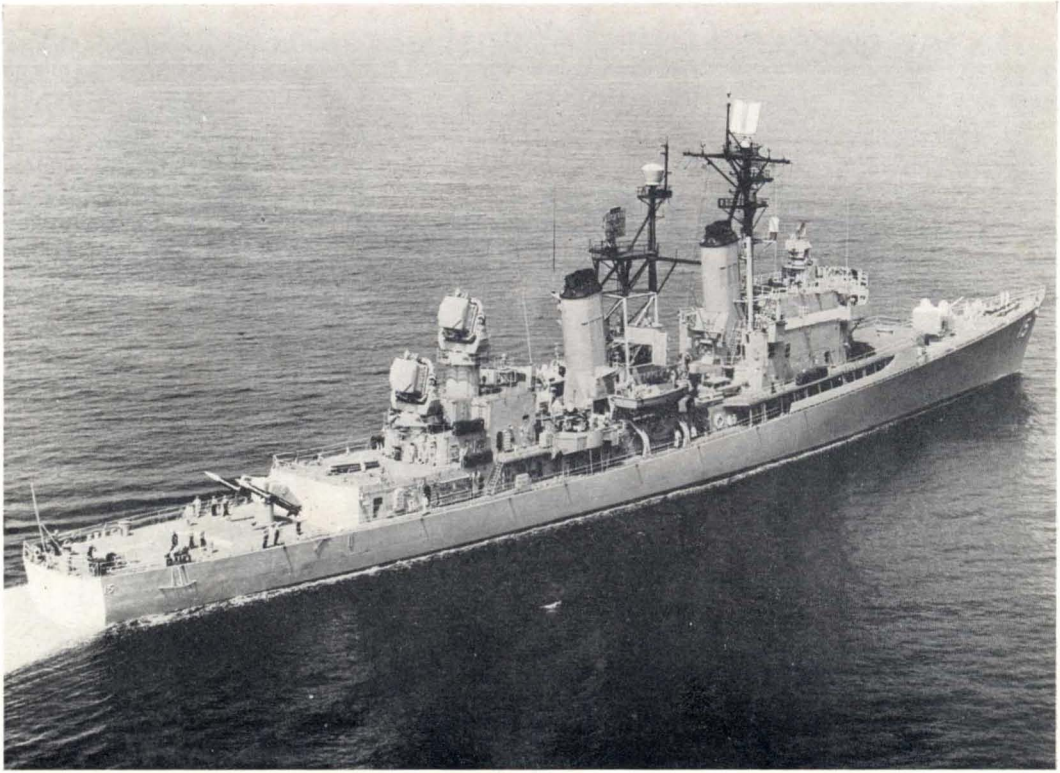
Standard displacement	*Full load displacement*	*Length*	*Beam*	*Draught*
4,700 tons	5,600 tons	520 feet	52⅔ feet	20 feet

Guided weapons	*Main guns*	*Anti-aircraft guns*	*Torpedo tubes*	*Anti-submarine weapons*
1 twin launcher for "Terrier" missiles	1–5 inch dual purpose	4–3 inch (2 twin)	6–21 inch fixed (2 triple)	ASROC 8-tube "Pepperbox" launcher and "Hedgehog"

Propelling machinery	*Shaft horse power*	*Boilers*	*Speed*	*Complement*
Geared steam turbines	80,000	4	34 knots	359

Name	*No.*	*Begun*	*Launched*	*Completed*	*Builders*	*Engineers*
COONTZ	DLG 9	2 Mar. 1957	6 Dec. 1958	15 July 1960	Puget Sound Naval Shipyard	Allis Chalmers
DAHLGREN	DLG 12	1 Mar. 1958	16 Mar. 1960	15 July 1961	Philadelphia Naval Shipyard	Allis Chalmers
DEWEY	DLG 14	10 Aug. 1957	30 Nov. 1958	7 Dec. 1959	Bath Iron Works, Bath, Maine	De Laval
FARRAGUT	DLG 6	3 June 1957	18 July 1958	17 Feb. 1961	Bethlehem Steel Co., Quincy	De Laval
KING	DLG 10	2 Mar. 1957	6 Dec. 1958	17 Nov. 1960	Puget Sound Naval Shipyard	Allis Chalmers
LUCE	DLG 7	1 Oct. 1957	11 Dec. 1958	15 July 1961	Bethlehem Steel Co., Quincy	De Laval
MACDONOUGH	DLG 8	15 Apr. 1958	9 July 1959	27 Oct. 1961	Bethlehem Steel Co., Quincy	De Laval
MAHAN	DLG 11	29 July 1957	7 Oct. 1959	28 Nov. 1960	San Francisco Naval Shipyard	Allis Chalmers
PREBLE	DLG 15	16 Dec. 1957	23 May 1959	9 May 1960	Bath Iron Works, Bath, Maine	De Laval
WILLIAM V. PRATT	DLG 13	1 Mar. 1958	16 Mar. 1960	19 Oct. 1961	Philadelphia Naval Shipyard	Allis Chalmers

PREBLE

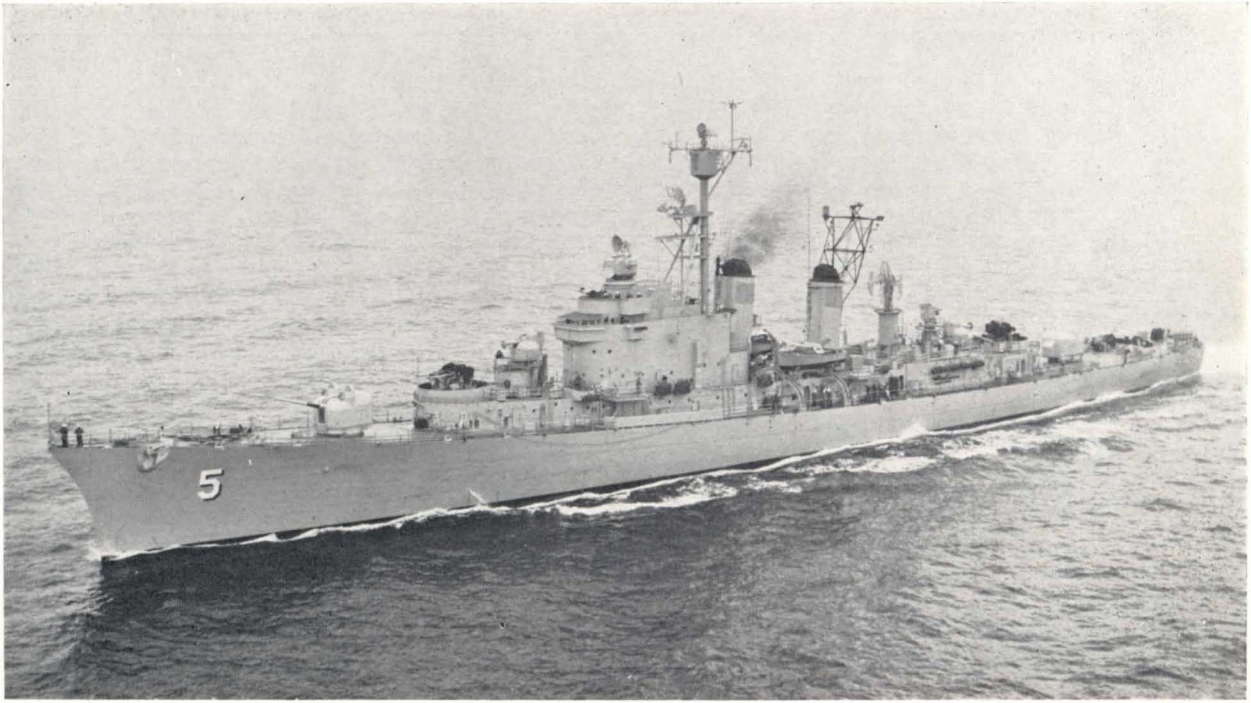


MITSCHER **JOHN S. McCAIN** **WILLIS A. LEE** **WILKINSON**

These ships were projected and laid down as destroyers, and were in fact the largest destroyers ever built in the United States and in the world, being larger than ships formerly rated as light cruisers in other countries. Of a new design specifically constructed as a long-range fleet type for both administrative and anti-submarine duties, they carry the latest surface, underwater and anti-aircraft weapons, and are equipped with newly developed electronic devices for hunter-killer missions. Their 5-inch guns are fully automatic loading, rapid firing and radar controlled. Newer longer range 3-inch, 70-calibre mountings were installed in 1957–8 in place of their former 3-inch, 50-calibre guns, and their four 20-mm. anti-aircraft guns were removed. Their propelling machinery, of light weight, includes many advanced engineering features not previously installed in fighting ships. *Mitscher* and *John S. McCain* have different propulsion plants from those in *Willis A. Lee* and *Wilkinson.* The "Mitscher" class were re-rated as destroyer leaders while still under construction in 1951, but were again re-classified as frigates early in 1955.

Standard displacement	*Full load displacement*	*Length*	*Beam*	*Draught*
3,675 tons	4,730 tons	493 feet	49 feet	21 feet
Main guns	*Anti-aircraft guns*	*Torpedo tubes*	*Anti-submarine weapons*	*Aircraft*
2–5 inch dual purpose (single)	2–3 inch (twin)	4 fixed A/S	2 Mk 108	1 helicopter
Propelling machinery	*Shaft horse power*	*Boilers*	*Speed*	*Complement*
Geared steam turbines	80,000	4 Combustion Engineering (first two) 4 Foster Wheeler (others)	35 knots	322

Name	*Begun*	*Launched*	*Completed*	*Builders*	*Engineers*
MITSCHER	3 Oct. 1949	26 Jan. 1952	16 May 1953	Bath Iron Works Corp.	General Electric Co.
JOHN S. MCCAIN	24 Oct. 1949	12 July 1952	12 Oct. 1953	Bath Iron Works Corp.	General Electric Co.
WILLIS A. LEE	1 Nov. 1949	26 Jan. 1952	28 Sept. 1954	Bethlehem Steel Co.	Westinghouse E. Corp.
WILKINSON	1 Feb. 1950	22 Apr. 1952	29 July 1954	Bethlehem Steel Co.	Westinghouse E. Corp.



WILKINSON

NORFOLK

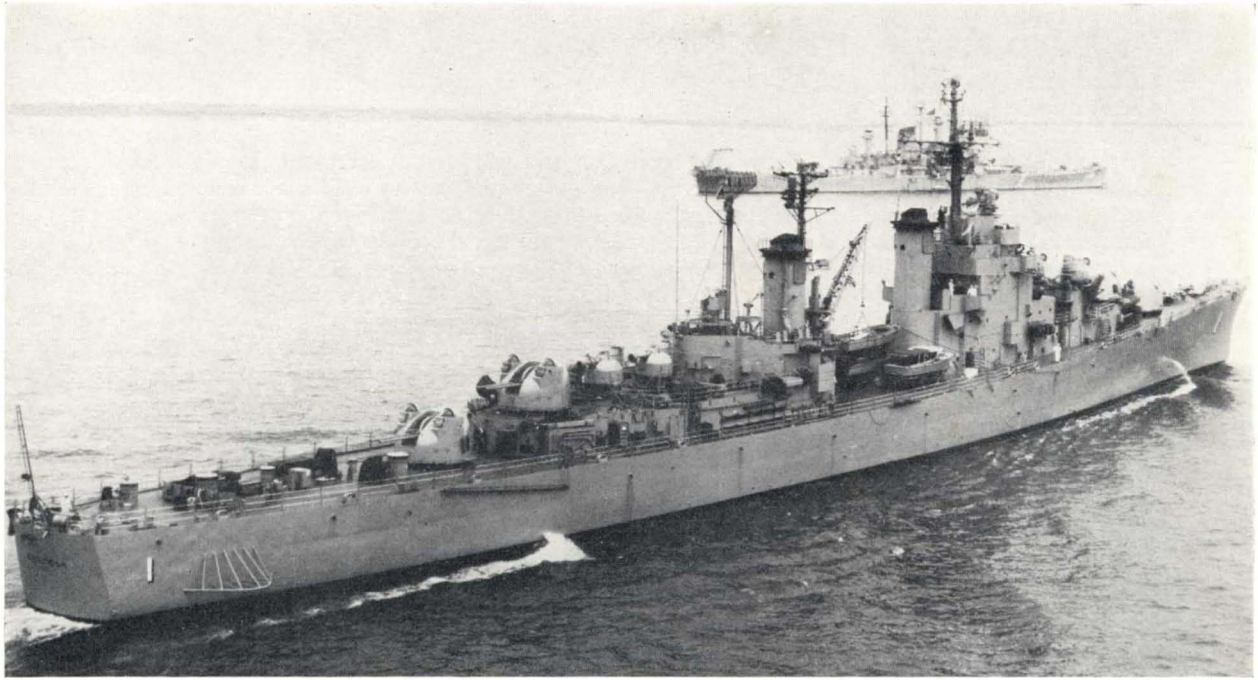
A rather peculiar vessel of hybrid type, difficult to classify, this ship was first designated a cruiser, hunter-killer ship, subsequently re-classified as a destroyer leader, and again re-classified as a frigate early in 1955. On a cruiser hull she mounts the armament of a destroyer, and was intended as a flagship for destroyers accompanying a heavy task force, her heavier displacement enabling her to carry the accumulation of modern anti-submarine and anti-aircraft devices impossible to mount in a destroyer hull. Her design has been evolved in the light of atomic experiments, and it is hoped and believed in the American Navy that neither atomic explosions nor weather will hinder this remarkable ship from operating at her full efficiency at all times. She is fitted with newly-developed communications equipment, including radar, sonar and electronics gear. Her former eight 20-mm. anti-aircraft guns have been removed. In general appearance she has a bow view similar to that of the "Mitscher" class destroyer leaders or frigates, described on a following page, although she is a considerably larger ship.

Standard displacement	*Full load displacement*	*Length*	*Beam*	*Draught*
5,600 tons	7,300 tons	540 feet	54 feet	26 feet

Main and Anti-aircraft guns	*Torpedo tubes*	*Anti-submarine weapons*	*Complement*
8–3 inch dual purpose	4 Mark 24	ASROC	480

Propelling machinery	*Shaft horse power*	*Boilers*	*Speed*
Geared steam turbines	80,000	4 Babcock & Wilcox	32 knots

Name	*Begun*	*Launched*	*Completed*	*Builders*
NORFOLK	1 Sept. 1949	29 Dec. 1951	4 Mar. 1953	New York Shipbuilding Corporation, Camden, N.J.



NORFOLK

ANDREA DORIA **CAIO DUILIO** **VITTORIO VENETO**

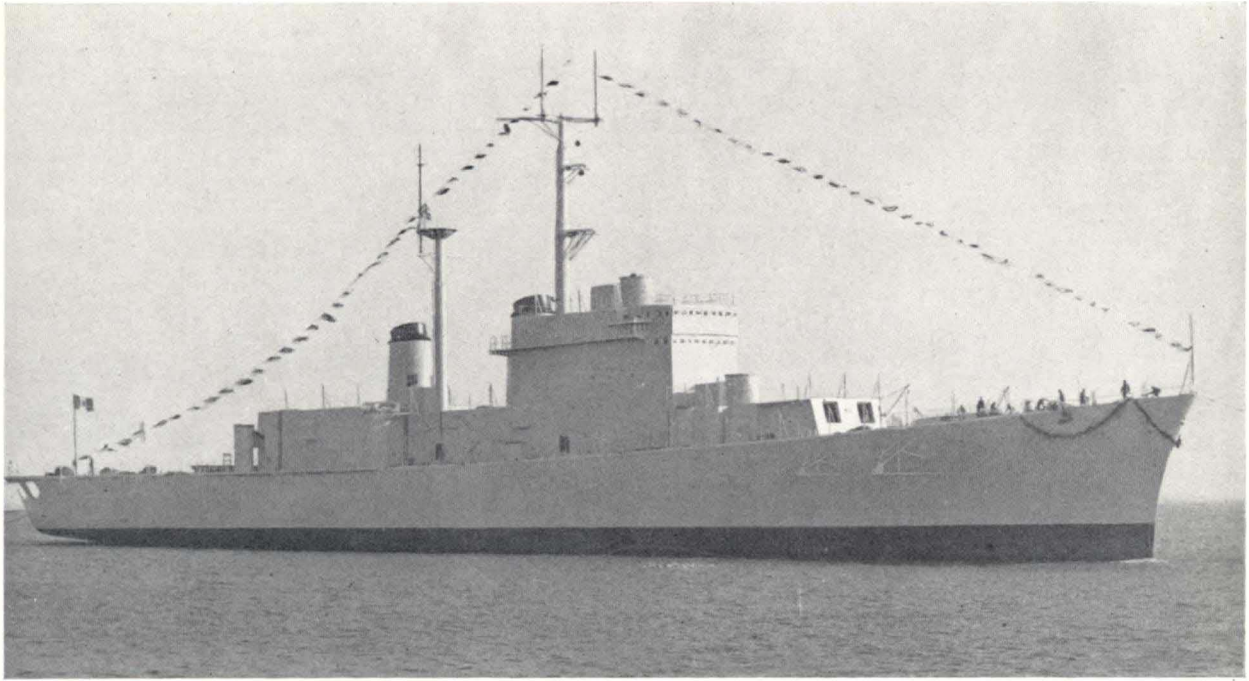
Of considerable interest to naval architects, these new escort cruisers or destroyer leaders of an entirely novel design specifically projected to carry both guided-missile launchers and heavy anti-submarine helicopters, are extraordinarily beamy in relation to their length. The "Terrier" surface-to-air guided-missile battery will be operated from a twin mounting forward. The helicopters will operate from a large flight deck or hover apron aft, a platform measuring 98½ by 52½ feet. The anti-aircraft battery will include eight 3-inch fully automatic weapons of a new pattern, disposed in single turrets, four on each side amidships abreast the funnels and the bridge. They have a rate of fire of 70 rounds per minute. These very unusual ships are officially rated as *Incrociatori di Scorta*. They perpetuate the names of battleships scrapped. They approximate to the United States guided-missile frigate or destroyer leader category, DLG.

	Standard displacement	*Full load displacement*	*Length*	*Beam*	*Draught*
Andrea Doria, Caio Duilio:	6,000 tons	6,500 tons	489¾ feet	56½ feet	16¼ feet
Vittorio Veneto:	7,000 tons	7,600 tons	534¾ feet	62⅓ feet	17⅓ feet

Main and Anti-aircraft guns	*Guided weapons*	*Aircraft*
8–3 inch	1 twin launcher for "Terrier" missiles	3 Sikorsky or 4 ASW helicopters (*A.D.* and *C.D.*) 6 Sikorsky or 9 ASW helicopters (*Vittorio Veneto*)

Propelling machinery	*Shaft horse power*	*Boilers*	*Speed*	*Complement*
Geared steam turbines	60,000 (*A.D.* and *C.D.*) 70,000 (*Vittorio Veneto*)	4 Foster-Wheeler	31 knots	450 500

Name	*Begun*	*Launched*	*Builders*
ANDREA DORIA	11 May 1958	17 Feb. 1963	Cantieri del Tirreno, Riva Trigoso
CAIO DUILIO	16 May 1958	22 Dec. 1962	Navalmeccanica, Castellammare di Stabia
VITTORIO VENETO	1963		Cantieri del Tirreno, Riva Trigoso



ANDREA DORIA

SAN GIORGIO **SAN MARCO**

These vessels have had a somewhat chequered career. They were originally built as *Pompeo Magno* and *Giulio Germanico*, respectively of the "*Capitani Romani*" (Roman Captains) class, and rated first as *Esploratori Oceanici* (Ocean Scouts) and then as light cruisers. *Giuio Germanico* was sunk by the Germans in Sept. 1943 before completion, but refloated in 1947. Both ships were converted into fleet destroyers by Cantrere del Tirreno Genova, and Navalmeccanica Castellammare di Stabia, respectively, being completed in the autumn of 1955 and recommissioned on 1 July 1955 and 20 Feb. 1956. They were re-rated as *Esploratori* (scouts) in 1957 and as *Cacciatorpediniere Conduttori* (destroyer leaders) in 1958.

Standard displacement	*Full load displacement*	*Length*	*Beam*	*Draught*
3,950 tons	5,600 tons	466½ feet	47¼ feet	21 feet

Main guns	*Anti-aircraft guns*	*Anti-submarine weapons*	*Complement*
6–5 inch	20–40 mm. A.A.	3-barrelled depth charge mortar	430

Propelling machinery	*Shaft horse power*	*Boilers*	*Speed*
Geared steam turbines	100,000	4 of 3-drum type	38 knots

Name	*Begun*	*Launched*	*Completed*	*Builders*	*Converted by*
SAN GIORGIO	23 Sept. 1939	28 Aug. 1941	24 June 1943	C. N. Riuniti, Ancona	C. Tirreno, Genova
SAN MARCO	11 May 1940	20 July 1941	19 Jan. 1956	Navalmeccanica Castellammare di Stabia	

Note: Two sister ships, the former Italian light cruisers *Attilio Regolo* and *Scipione Afrieano*, allocated to France in 1948 as her share of surrendered Italian tonnage, and renamed *Chateaurenault* and *Guichen*, respectively, were modernised and reconstructed as fast anti-submarine and anti-aircraft escort cruisers in 1951–54, re-rated as *Escorteurs d'Escadre* in 1955, and fitted out as Command Ships and Flotilla Leaders in 1958–59, but they were reduced to harbour reserve in 1961–62 and stricken from the list.

H

SAN GIORGIO

DESTROYERS

THE word destroyer was a diminutive of the older term "torpedo-boat destroyer", self-explanatory of the vessel's original function. In 1892 the menace of the torpedo-boat was so formidable that it was resolved to take special measures against it. The result was the construction of torpedo-boat destroyers. In designing the first destroyers the evolution of a decade was bridged by taking the characteristics of the torpedo-boat and magnifying them to twice the displacement of the craft they were intended to destroy. The first British destroyers, the *Havock* and *Hornet*, displaced 240 tons and carried a 12-pounder gun, three 6-pounders and one 18-inch torpedo tube, reciprocating engines giving them a speed of 26½ knots. The success of these ships, which proved to be good sea-boats, justified the construction of destroyers on a large scale. The first destroyers propelled by turbines were the *Viper* and *Cobra* of 400 tons, designed for a speed of 35 knots. In a decade the torpedo-boat destroyer had usurped the functions of the torpedo-boat itself which was rendered ineffective and obsolete. The two types had practically merged. By 1906–8 British destroyers had grown progressively through the A, B, C, D, and E classes into the F class of ocean-going ships of 855 to 1,062 tons with two 4-inch guns and two 18-inch torpedo tubes, oil-fired boilers and turbines giving speeds of 35 knots. With the passing of the 1,000 ton displacement mark, the adoption of oil fuel and the introduction of the 4-inch gun the shape of the modern destroyer could be discerned. The last coal-fired British destroyers were the "G" class, 1910, in which 21-inch torpedoes were introduced. By the outbreak of the First World War in 1914 some 240 destroyers had been built. Developed through the H, I, K, L, M, N, O, P boats, about 280 destroyers were built during the period of hostilities. Geared turbines instead of direct turbines were installed, resulting in an increase of speed to 36 knots, and the R, S, T and U group were of basically standard design to which the bulk of the destroyers were built during the war, and a dozen were still in service in 1939, eight surviving until the end of the Second World War. In the V and W boats a great advance in fighting power was effected, and the design

of these ships remained the essential pattern upon which were based all subsequent destroyers built between the two great wars, not only in Great Britain but all over the world. No fewer than 54 of the V and W class were still in service in 1939 and over 40 survived until 1946 after careers of over a quarter of a century. By the end of the First World War the destroyers' original function of destroying torpedo-boats was almost completely extraneous to its many and varied new duties. Although the main use of destroyers was with the battle fleet, to ward off enemy destroyers and torpedo-attack the enemy battle fleet, it was as anti-submarine hunters and killers that they shone. During the 1914–18 war Britain lost 69 destroyers. Of the 370 which survived the war many were soon scrapped. In 1922 there were only 185 left, a number which remained fairly constant between the wars by scrapping old ones as new vessels were built. No new destroyers were laid down for ten years after the Armistice except the experimental *Ambuscade* and *Amazon*. Then a new alphabetical cycle was initiated, the 68 destroyers of the "A" to "I" flotillas, completed 1930–8, displacing 1,335 to 1,375 tons with four 4.7-inch guns, eight 21-inch torpedo tubes, and speeds of 35–36 knots. There followed the large "Tribal" class of 16 units, completed in 1938–9, displacing 1,870 tons, heavily armed with eight 4.7-inch guns in twin shields, seven smaller guns and four 21-inch tubes, and steaming at 36½ knots. The 24 vessels of the J, K and N flotillas of 1,760 tons mounted six 4.7-inch guns, six smaller weapons and ten 21-inch torpedo tubes, and the 16 of the L and M flotillas completed early in the late war displaced 1,920 tons. The alphabetical cycle was completed during the war with O, P, Q, R, S, T, U, V, W, and Z flotillas. The "C", "Battle", "Weapon" and "Daring" classes are described on the following pages. In 1939 Britain had 180 destroyers. During the war 140 were lost; some 220 were built and 50 were acquired from the United States. About 280 were in service in 1946. In 1955 Britain had 80 destroyers and in 1963 she has 25. The United States has 356 destroyers (and 275 destroyer escorts). Russia has 165 destroyers.

DAINTY DARING DECOY DEFENDER DELIGHT DIAMOND DIANA DUCHESS

The largest orthodox destroyers in the Royal Navy, these ships represent a development and a combination of the "Battle" and "Weapon" designs. Basically a wartime conception they embodied the latest ideas in warship construction and incorporated many features new to British ships. Their propelling machinery uses higher steam pressures and temperatures than ever before. Their after bank of quintuple torpedo tubes was removed in 1958. Three more destroyers of the "Daring" class, the *Vampire*, *Vendetta* and *Voyager*, have been built in Australia for the Royal Australian Navy.

Standard displacement	*Full load displacement*	*Length*	*Beam*	*Draught*
2,810 tons	3,600 tons	390 feet	43 feet	17 feet

Main guns	*Anti-aircraft guns*	*Torpedo tubes*	*Anti-submarine weapons*	*Complement*
6–4.5 inch	6–40 mm.	5–21 inch	"Squid" triple barrelled depth charge mortar	278–308

Propelling machinery	*Shaft horse power*	*Boilers*	*Speed*
Geared steam turbines	54,000	2 Foster Wheeler or 2 Babcock	34.75 knots

Name	*Begun*	*Launched*	*Completed*	*Builders*
DAINTY	17 Dec. 1945	16 Aug. 1950	26 Feb. 1953	J. Samuel White & Co. Ltd., Cowes
DARING	29 Sep. 1945	10 Aug. 1949	8 Mar. 1952	Swan, Hunter & Wigham Richardson, Wallsend
DECOY	22 Sep. 1946	29 Mar. 1949	28 Apr. 1953	Yarrow & Co. Ltd., Scotstoun, Glasgow
DEFENDER	22 Mar. 1949	27 July 1950	5 Dec. 1952	Alex. Stephen & Sons Ltd., Govan
DELIGHT	5 Sep. 1946	21 Dec. 1950	9 Oct. 1953	Fairfield S.B. & Eng. Co. Ltd., Govan
DIAMOND	15 Mar. 1949	14 June 1950	21 Feb. 1952	John Brown & Co. Ltd., Clydebank
DIANA	3 Apr. 1947	8 May 1952	29 Mar. 1954	Yarrow & Co. Ltd., Scotstoun, Glasgow
DUCHESS	2 July 1948	9 Apr. 1951	23 Oct. 1952	John I. Thornycroft & Co. Ltd., Woolston

Note: Of the three fast minelayers of the "Manxman" class, *Apollo* was scrapped in 1962 and *Ariadne* in 1963; and *Manxman* has been converted into a Minesweeper Support Ship (see full particulars and photograph on pages 126 and 127 of the 1960 Edition).

DIAMOND

BROADSWORD **CROSSBOW** **SCORPION**

When first commissioned these ships were regarded as the ugliest and most peculiar-looking destroyers ever built. Certainly they had little chance of being mistaken for other classes. They were originally armed and equipped as fleet anti-submarine escorts, and were actually not far removed from the frigate category, as will be seen if their details are compared with those of the "full conversion" frigates described later. In *Battleaxe* and *Broadsword* the squids were forward of the bridge, in *Crossbow* and *Scorpion* they were aft, having been interchanged with the twin 4-inch mount. A newer-type anti-submarine weapon, the "Limbo", was mounted in *Scorpion*. This weapon is an improved "Squid", having a longer barrel, and is capable of projecting its bombs to a range considerably greater than its predecessor. In 1958–60 all four ships were converted into radar picket (aircraft direction) escorts, of which the *Broadsword* was the first. They have an extra lattice mast stepped between the funnels, and the ten 21-inch torpedo tubes have been suppressed. *Battleaxe* is being scrapped in 1963 as a consequence of extensive damage sustained in a collision in Aug. 1962.

Standard displacement	*Full load displacement*	*Length*	*Beam*	*Draught*
2,280 tons	2,935 tons	365 feet	38 feet	17 feet

Main guns	*Anti-aircraft guns*	*Anti-submarine weapons*	*Complement*
4–4 inch	6–40 mm.	2 "Squid" triple barrelled depth charge mortars *Scorpion* 1 "Limbo" three barrelled depth charge mortar	234 to 256

Propelling machinery	*Shaft horse power*	*Boilers*	*Speed*
Geared steam turbines	40,000	2 Foster Wheeler	34 knots

Name	*Begun*	*Launched*	*Completed*	*Builders*
BROADSWORD	20 July 1944	5 Feb. 1946	4 Oct. 1948	Yarrow & Co. Ltd., Scotstoun, Glasgow
CROSSBOW	26 Aug. 1944	20 Dec. 1945	4 Mar. 1948	John I. Thornycroft & Co. Ltd., Woolston
SCORPION	16 Dec. 1944	15 Aug. 1946	17 Sep. 1947	J. Samuel White & Co. Ltd., Cowes

BROADSWORD

AGINCOURT **AISNE** **BARROSA** **CORUNNA**

These four ships are the survivors of the Later "Battle" class destroyers. In 1961–62 they were completely reconstructed and converted into Fleet Radar Pickets, or aircraft direction destroyers. Little remains of the original ships except the hull, engines and boilers. Internally they were entirely redesigned to give a higher standard of fighting efficiency and habitability. The operations room is one of the most complex and compact ever contrived in destroyers. The fifth 4·5-inch gun abaft the funnel, the eight 40-mm. anti-aircraft guns in four twin mountings, and the ten 21-inch torpedo tubes in two quintuple banks of the original ships were suppressed. A beam to beam lattice foremast was stepped across the ship to support the massive "double bedstead" radar, and the "seacat" guided missile launcher was mounted on the after end of the superstructure.

Standard displacement	*Full load displacement*	*Length*	*Beam*	*Draught*
2,480 tons	3,430 tons	379 feet	40½ feet	17½ feet

Main guns	*Guided weapons*	*Anti-submarine weapons*	*Complement*
4–4.5 inch (2 twin)	1 quadruple launcher for "Seacat" missiles	"Squid" triple barrelled depth charge mortar	232–268

Propelling machinery	*Shaft horse power*	*Boilers*	*Speed*
Geared steam turbines	50,000	2 Admiralty 3-drum type	35.75 knots

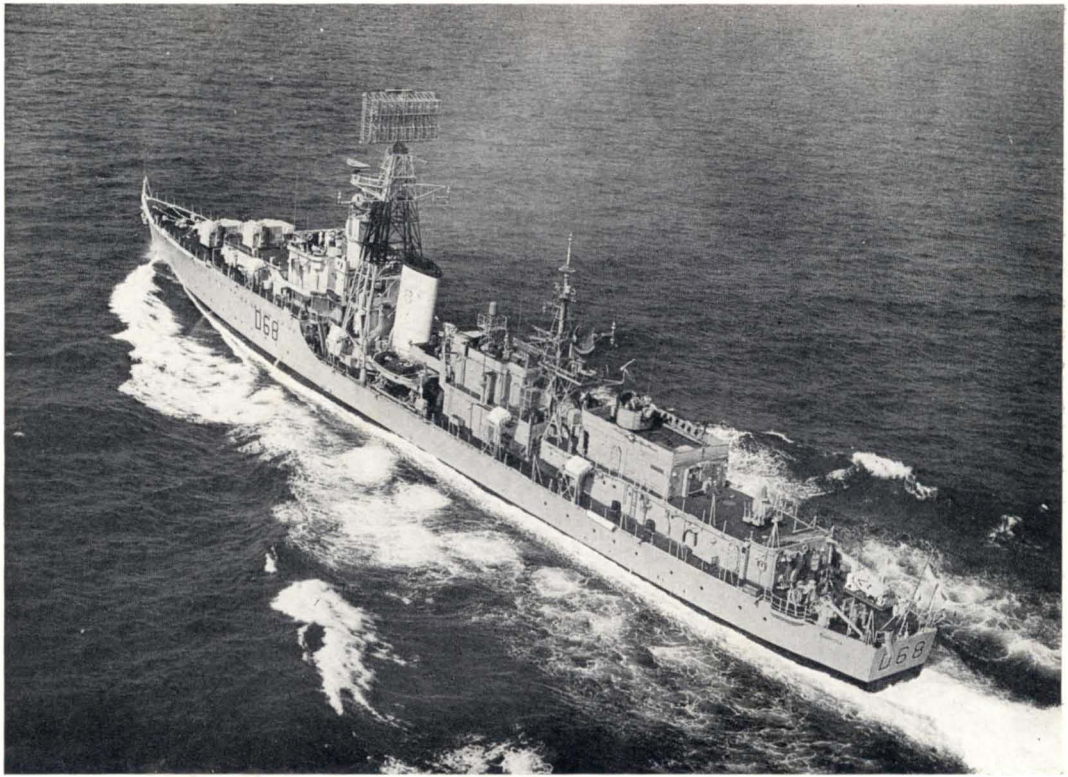
Name	*Begun*	*Launched*	*Completed*	*Builders*
AGINCOURT	12 Dec. 1943	29 June 1945	25 June 1947	R. & W. Hawthorn Leslie & Co. Ltd., Hebburn-on-Tyne
AISNE	26 Aug. 1943	12 May 1945	20 Mar. 1947	Vickers-Armstrongs Ltd., Newcastle-on-Tyne
BARROSA	28 Dec. 1943	17 Jan. 1945	14 Feb. 1947	John Brown & Co. Ltd., Clydebank
CORUNNA	12 Apr. 1944	29 May 1945	6 June 1947	Swan, Hunter & Wigham Richardson Ltd., Wallsend

Note: Of the four unconverted units of the Later "Battle" class, *Alamein* was scrapped in 1963, when *Dunkirk* and *Jutland* were paid off for disposal and *Matapan* was laid up in reserve.

Of the sixteen destroyers of the Early "Battle" class, *Cadiz* and *Gabbard* were sold to Pakistan in 1956 and renamed *Khaibar* and *Badr*, respectively; *Hogue* was discarded for scrap in 1960, *Armada*, *Barfleur*, *Gravelines*, *Lagos*, *St. James*, *St. Kitts* and *Vigo* were scheduled for disposal in 1961, *Camperdown*, *Finisterre*, *Saintes* and *Solebay* in 1962, and *Sluys* and *Tralfagar* in 1963.

Two Australian-built destroyers of the "Battle" type are in the Royal Australian Navy.

BARROSA



CAESAR CAMBRIAN CAPRICE CARYSFORT CASSANDRA CAVALIER CAVENDISH

Originally there were four flotillas of eight ships, the "Ca", "Ch", "Co" or "Cr" classes. *Crescent* and *Crusader* were transferred to the Royal Canadian Navy. *Charity*, *Chivalrous*, *Creole* and *Crispin* were sold to the Royal Pakistan Navy and renamed *Shah Jahan*, *Taimur*, *Alamgir* and *Jahangir* respectively, and *Cromwell*, *Crown*, *Crystal* and *Croziers* were sold to the Royal Norwegian Navy as *Bergen*, *Oslo*, *Stavanger* and *Trondheim* respectively. Originally all ships had four 4.5-inch guns, but there were subsequently many variations. They were latterly reconstructed, modernised and converted for anti-submarine warfare, and standardised to two types, one with three 4.5-inch guns, the other with two 4.5-inch guns and fitted for minelaying. *Carron* was disarmed for service as Navigation Tender in 1960 and discarded in 1963.

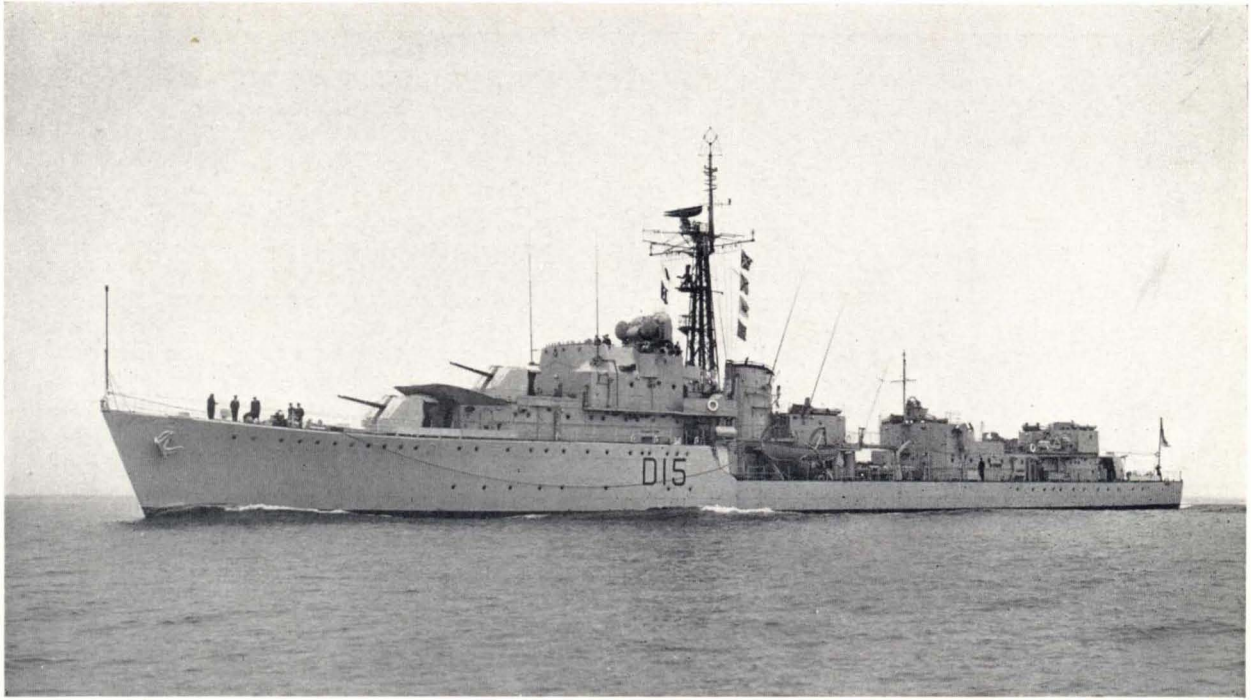
Standard displacement	*Full load displacement*	*Length*	*Beam*	*Draught*
2,020 tons	2,600 tons	362¾ feet	35⅝ feet	16 feet

Main guns	*Anti-aircraft guns*	*Torpedo tubes*	*Anti-submarine weapons*
3–4.5 inch	4–40 mm.	4–21 inch	2 "Squid" triple barrelled depth charge mortars

Propelling machinery	*Shaft horse power*	*Boilers*	*Speed*	*Complement*
Parsons geared turbines	40,000	2 Admiralty 3-drum type	36.75 knots	186 to 222

Name	*Begun*	*Launched*	*Completed*	*Builders*
CAESAR	3 Apr. 1943	14 Feb. 1944	5 Oct. 1944	John Brown & Co. Ltd., Clydebank
CAMBRIAN	14 Aug. 1942	10 Dec. 1943	17 July 1944	Scott's S.B. & Eng. Co. Ltd., Greenock
CAPRICE	28 Sep. 1942	16 Sep. 1943	5 Apr. 1944	Yarrow & Co. Ltd., Scotstoun, Glasgow
CARRON	26 Nov. 1942	28 Mar. 1944	6 Nov. 1944	Scotts' S.B. & Eng. Co. Ltd., Greenock
CARYSFORT	12 May 1943	25 July 1944	20 Feb. 1945	J. Samuel White & Co. Ltd., Cowes, I. of W.
CASSANDRA	30 Jan. 1943	29 Nov. 1943	28 July 1944	Yarrow & Co. Ltd., Scotstoun, Glasgow
CAVALIER	28 Feb. 1943	7 Apr. 1944	22 Nov. 1944	J. Samuel White & Co. Ltd., Cowes, I. of W.
CAVENDISH	19 May 1943	12 Apr. 1944	13 Dec. 1944	John Brown & Co. Ltd., Clydebank

Note: Of this class *Constance* was scrapped in 1956, *Comus* in 1958, *Contest* and *Cossack* in 1960, *Cheviot*, *Chieftain*, *Childers*, *Cockade*, *Comet*, *Concord* and *Consort* in 1962, and *Chaplet*, *Chequers* and *Chevron* in 1963.



CAVENDISH

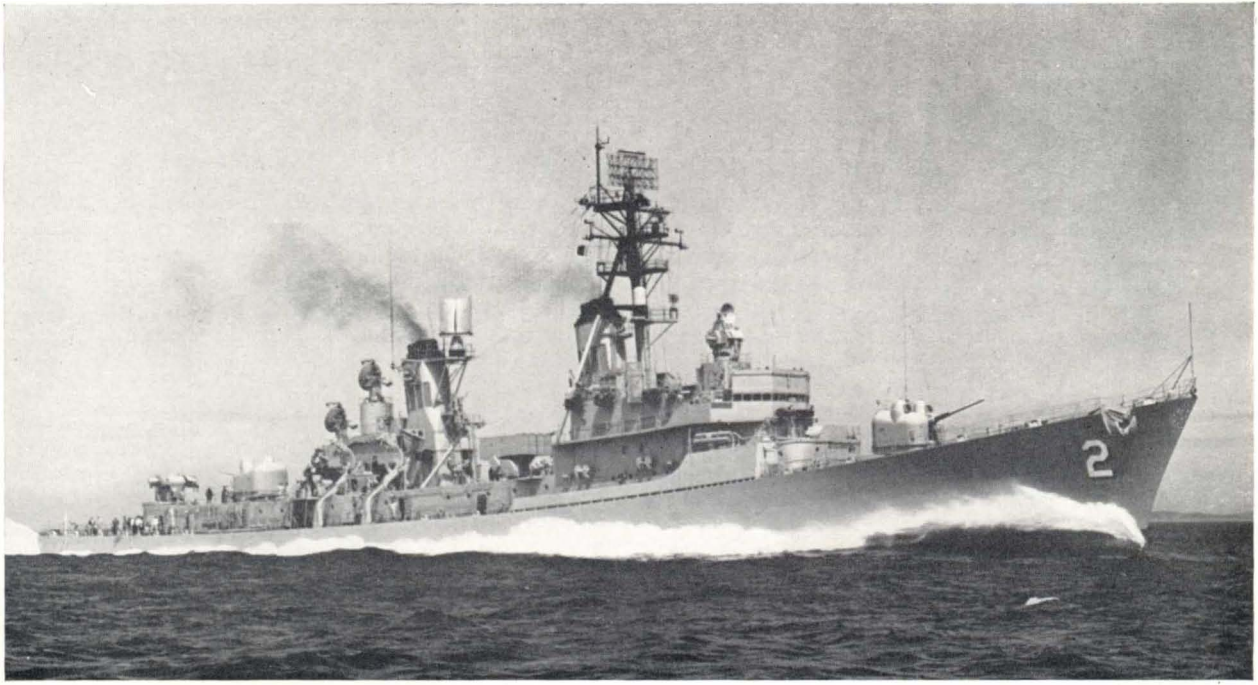
BARNEY	**BUCHANAN**	**HENRY B. WILSON**	**LYNDE McCORMICK**	**SEMMES**
BENJAMIN STODDERT	**CHARLES F. ADAMS**	**HOEL**	**RICHARD E. BYRD**	**TATTNALL**
BERKELEY	**COCHRANE**	**JOHN KING**	**ROBISON**	**TOWERS**
BIDDLE	**CONYNGHAM**	**JOSEPH STRAUSS**	**SAMPSON**	**WADDELL**
	GOLDSBOROUGH	**LAWRENCE**	**SELLERS**	

Guided-missile ships of the destroyer category, these vessels are equipped to launch "Tartar" surface-to-air missiles which are smaller than "Terrier" weapons with greater range. They are also armed with two main singly-mounted rapid-firing 5-inch guns and the latest anti-submarine weapons. As compared with previous destroyers the new ships have greater overall length, a wider beam and heavier displacement. They have a new hull design which is an evolution of the "Forrest Sherman" type and like the latter have aluminium superstructures. The most recent habitability improvements are incorporated into their construction, including the air conditioning of all living spaces. The 23 ships were laid down in 1958–62 and launched in 1959–63 for completion in 1960–64. The original design provided for two 5-inch guns, one forward in "A" position and one aft in "Y" position, with anti-submarine weapons in "B" position and guided missiles in "X" position, but the after 5-inch gun in "Y" position was transposed in favour of a guided-missile launcher. 42 missiles are carried They have a range of 15 to 20 miles.

Standard displacement	*Full load displacement*	*Length*	*Beam*	*Draught*
3,370 tons	4,500 tons	437 feet	47 feet	20 feet

Main guns	*Guided weapons*	*Anti-submarine weapons*	*Complement*
2–5 inch	1 twin launcher for "Tartar" missiles	Rocket launchers (ASROC)	354

Propelling machinery	*Shaft horse power*	*Boilers*	*Speed*
Geared steam turbines	70,000	4	35 knots



CHARLES F. ADAMS

BARRY	**DU PONT**	**JONAS INGRAM**	**RICHARD S. EDWARDS**
BIGELOW	**EDSON**	**MANLEY**	**SOMERS**
BLANDY	**FORREST SHERMAN**	**MORTON**	**TURNER JOY**
DAVIS	**HULL**	**MULLINIX**	
DECATUR	**JOHN PAUL JONES**	**PARSONS**	

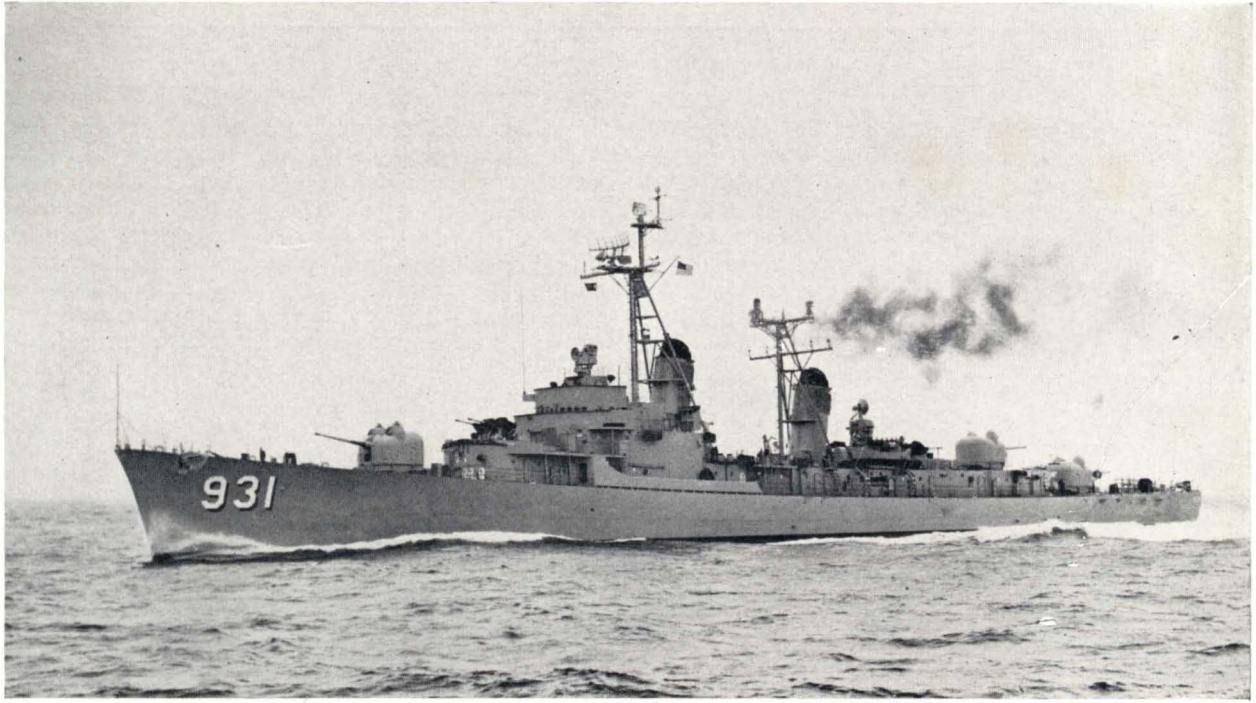
The largest conventionally armed American destroyers, these vessels are not radical in design, but embody certain improvements in armament. They have increased freeboard aft, and the entire ship's structure above the main deck, including gun foundations, is of aluminium to obtain the maximum stability while maintaining the minimum displacement. They are air conditioned throughout. The 5-inch dual purpose guns are in single turret mountings disposed one forward and two aft. The 3-inch anti-aircraft guns are in new pattern twin enclosed gunhouses. Tubes are replaced by torpedo racks between the funnels. *Barry* has been fitted with a new clipper bow housing a new type of sonar dome and has stem anchor only.

Standard displacement	*Full load displacement*	*Length*	*Beam*	*Draught*
2,850 tons	4,200 tons	418½ feet	45 feet	19½ feet

Main guns	*Anti-aircraft guns*	*Torpedo tubes*	*Anti-submarine weapons*
3–5 inch dual purpose	4–3 inch	4–21 inch A/S fixed (racks)	2 Hedgehogs

Propelling machinery	*Shaft horse power*	*Boilers*	*Speed*	*Complement*
Geared steam turbines	70,000	4	33 knots	255

All eighteen ships were laid down in 1953–7, launched in 1955–8 and completed in 1955–9, the *Forrest Sherman* being the first and name-ship of the class. Builders: Bath Iron Works Corp., Bath, Maine: *Forrest Sherman*, *John Paul Jones*, *Barry*, *Manley*, *Du Pont*, *Bigelow*, *Hull*, *Edson* and *Somers*. Bethlehem Steel Co., Quincy: *Decatur*, *Davis*, *onas Ingram*, *Blandy* and *Mullinix*. Ingalls Shipbuilding Corp.: *Morton* and *Parsons*. Puget Sound Bridge & Dredging Co., Seattle: *Richard S. Edwards* and *Turner Joy*



FORREST SHERMAN

CARPENTER **HARWOOD** **LLOYD THOMAS** **NORRIS**
FRED T. BERRY **KEPPLER** **McCAFFERY** **ROBERT A. OWENS**

Originally intended as units of the "Gearing" class fleet destroyers, these ships were converted to form a fast, long-range anti-submarine striking force. Additional multiple anti-submarine mortars were installed amidships and aft, and a number of sono-buoys were included in the equipment. These are dropped in a diamond-shaped pattern (one in the middle) outlining an area in which a submarine is suspected to be in operation. They contain microphones, and by keeping track of which picks up the loudest sound the destroyer can determine in which direction and at what speed and depth the submarine is moving. Once this is detected the destroyer moves in rapidly for the kill, laying down a pattern of depth bombs. These ships were classified as DDE (i.e. fleet destroyers [DD] modified for escort duties [E]), but they were originally described as DDK, hunter-killer destroyers. Redesignated DD in 1963. The first line in the tabulated details refers to *Carpenter* and *Robert A. Owens* only.

Standard displacement	*Full load displacement*	*Length*	*Beam*	*Draught*
2,500 tons	3,350 tons	390½ feet	41 feet	19 feet
2,425 tons	3,300 tons			

Main guns	*Anti-aircraft guns*	*Torpedo tubes*	*Anti-submarine weapons*
	4–3 inch	None	2 large ahead throwing weapons
4–5 inch	8–3 inch	5–21 inch	1 large multiple mortar

Propelling machinery	*Shaft horse power*	*Boilers*	*Speed*	*Complement*
Geared steam turbines	60,000	4	35 knots	257 to 305

All eight ships were launched in 1945–6. *Robert A. Owens* was built by Bath Iron Works Corp.; *Keppler* and *Lloyd Thomas* by Bethlehem, San Francisco; *Fred T. Berry*, *Harwood*, *McCaffery* and *Norris* by Bethlehem, San Pedro; and *Carpenter* by Consolidated Steel Corp. (completed by Newport News).

CARPENTER

BASILONE **EPPERSON** **NEW** **ROBERT L. WILSON**
DAMATO **HOLDER** **RICH**

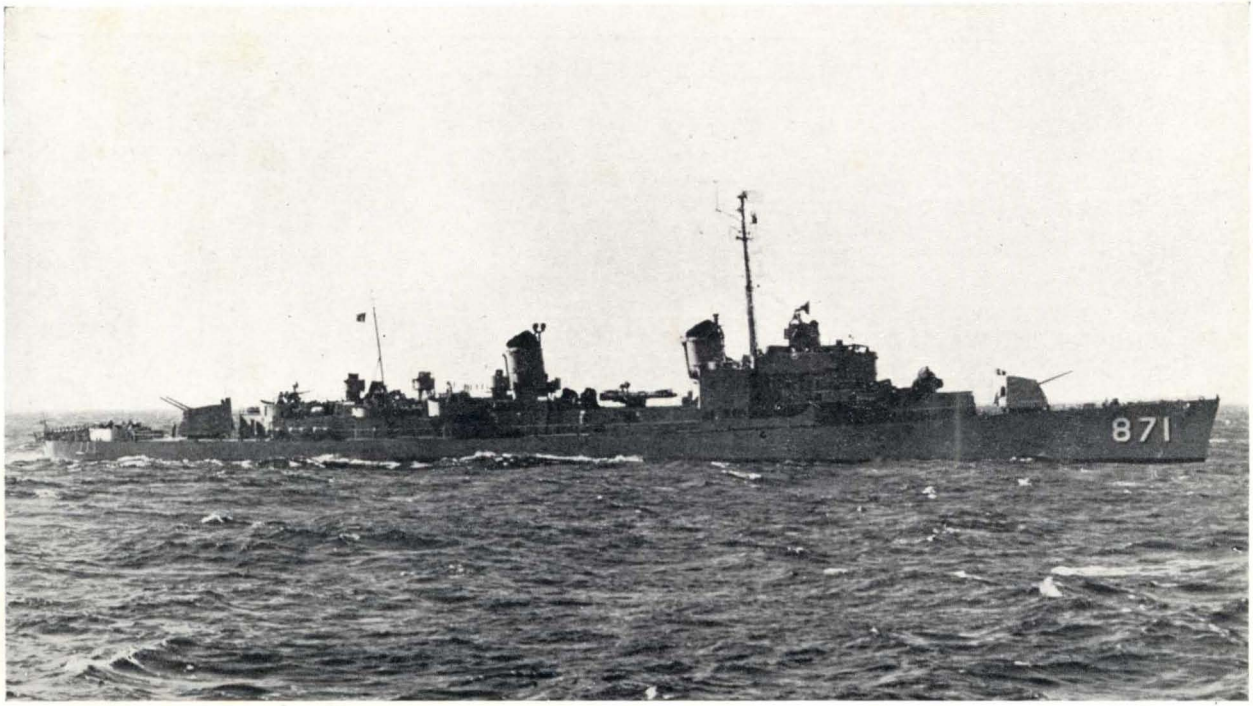
These seven vessels were further conversions of the "Gearing" class destroyers, somewhat similar to the "Carpenter" class previously described. The *Basilone* and *Epperson* had for a long time been suspended and laid up in an incomplete state after the Second World War, but they were eventually resumed and converted for anti-submarine warfare, and were completed as escort destroyers. They were armed with new weapons and were equipped with improved sonar and other electronic gear. The other five units were converted into escort destroyers after having been in service as fleet destroyers and they were also redesignated from DD to DDE. All were redesignated DD in 1963.

Standard displacement	*Full load displacement*	*Length*	Beam	*Draught*
2,425 tons	3,500 tons	390½ feet	41 feet	19 feet

Main guns	*Anti-aircraft guns*	*Torpedo tubes*	*Anti-submarine weapons*
4–5 inch	4 to 10–3 inch	5–21 inch (none in *Basilone* and *Epperson*)	1 ahead throwing mortar

Propelling machinery	*Shaft horse power*	*Boilers*	*Speed*	*Complement*
Geared steam turbines	60,000	4	35 knots	300

Name	*Launched*	*Completed*	*Builders*
BASILONE	21 Dec. 1945	21 July 1949	Consolidated Steel Corp.
DAMATO	21 Nov. 1945	26 Apr. 1946	Bethlehem, Staten Island
EPPERSON	22 Dec. 1945	19 Mar. 1949	Federal S. B. & D. D. Co.
HOLDER	25 Aug. 1945	17 May 1946	Consolidated Steel Corp.
NEW	18 Aug. 1945	4 Apr. 1946	Consolidated Steel Corp.
RICH	5 Oct. 1945	2 July 1946	Consolidated Steel Corp.
ROBERT L. WILSON	5 Jan. 1946	28 Mar. 1946	Bath Iron Works Corp.

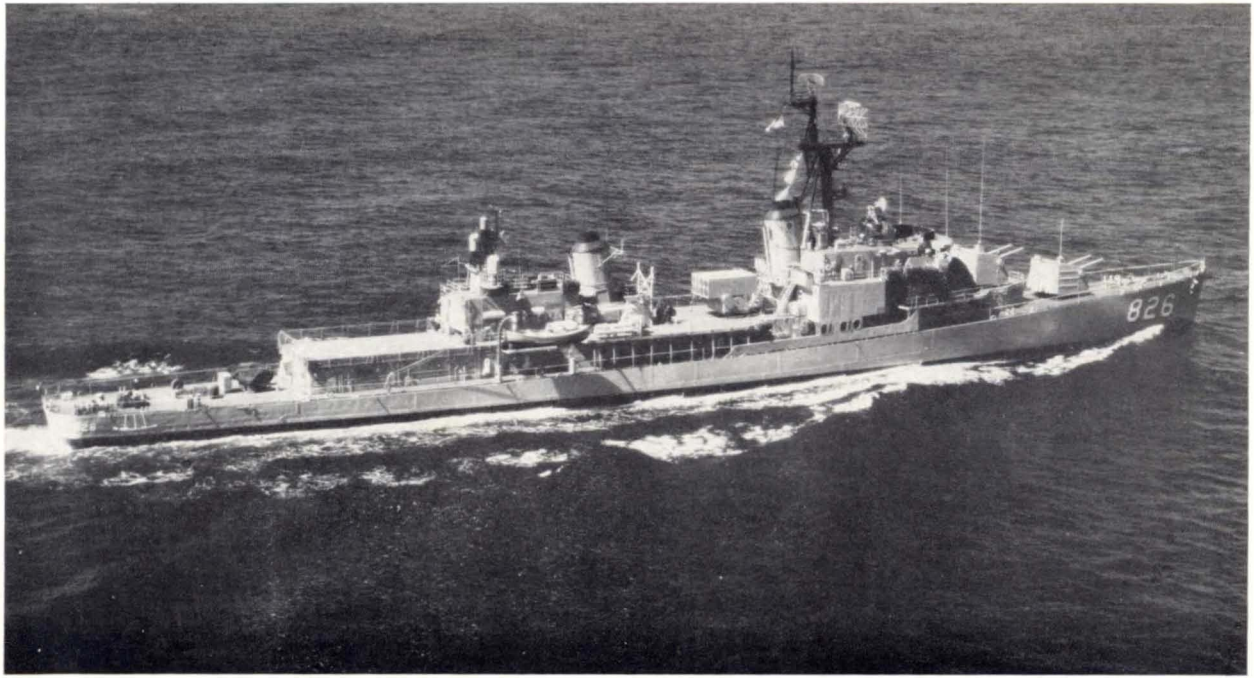


DAMATO

AGERHOLM	GEORGE H. McKENZIE	LEONARD F. MASON	SAMUEL B. ROBERTS
ARNOLD J. ISBELL	GLENNON	MEREDITH	SARSFIELD
BAUSSELL	GURKE	NOA	SHELTON
BRINKLEY BASS	GYATT	ORLECK	STRIBLING
BROWNSON	HAMNER	OZBOURN	THEODORE E. CHANDLER
CHARLES H. ROAN	HAROLD J. ELLISON	PERRY	VOGELGESANG
CHARLES R. WARE	HENDERSON	POWER	WARRINGTON
CONE	HOLLISTER	RICHARD B. ANDERSON	WILLIAM C. LAWE
EVERSOLE	JAMES E. KYES	RICHARD E. KRAUS	WILTSIE
FLOYD B. PARKS	JOHN R. CRAIG	ROBERT H. McCARD	WITEK
FORREST ROYAL	JOHNSTON	ROWAN	
GEARING	JOSEPH P. KENNEDY, Jr.	RUPERTUS	

Representing the ultimate Second World War development of the American destroyer, these ships incorporate the lessons learnt in four years of Pacific warfare. The former pole mast was replaced by a tripod to carry the radar assembly, and the 40-mm. guns were replaced by six 3-inch guns. The *Gyatt* was converted into a guided-missile destroyer, with the new designation DDG, in 1956, and most of the others have been converted for anti-submarine warfare under the FRAM (Fleet Rehabilitation and Modernisation) Programme with DASH helicopter platform.

Standard displacement	*Full load displacement*	*Length*	*Beam*	*Draught*
2,425 tons	3,479 tons	390½ feet	41 feet	19 feet
Main guns	*Anti-aircraft guns*	*Torpedo tubes*	*Anti-submarine weapons*	*Guided missiles*
4–5 inch *Gyatt:* 4–5 inch	Removed *Gyatt:* 4–3 inch	2 triple launchers	ASROC 2 hedgehogs	*Gyatt:* Twin "Terrier"
Propelling machinery	*Shaft horse power*	*Boilers*	*Speed*	*Complement*
Geared steam turbines	60,000	4	35 knots	257



AGERHOLM

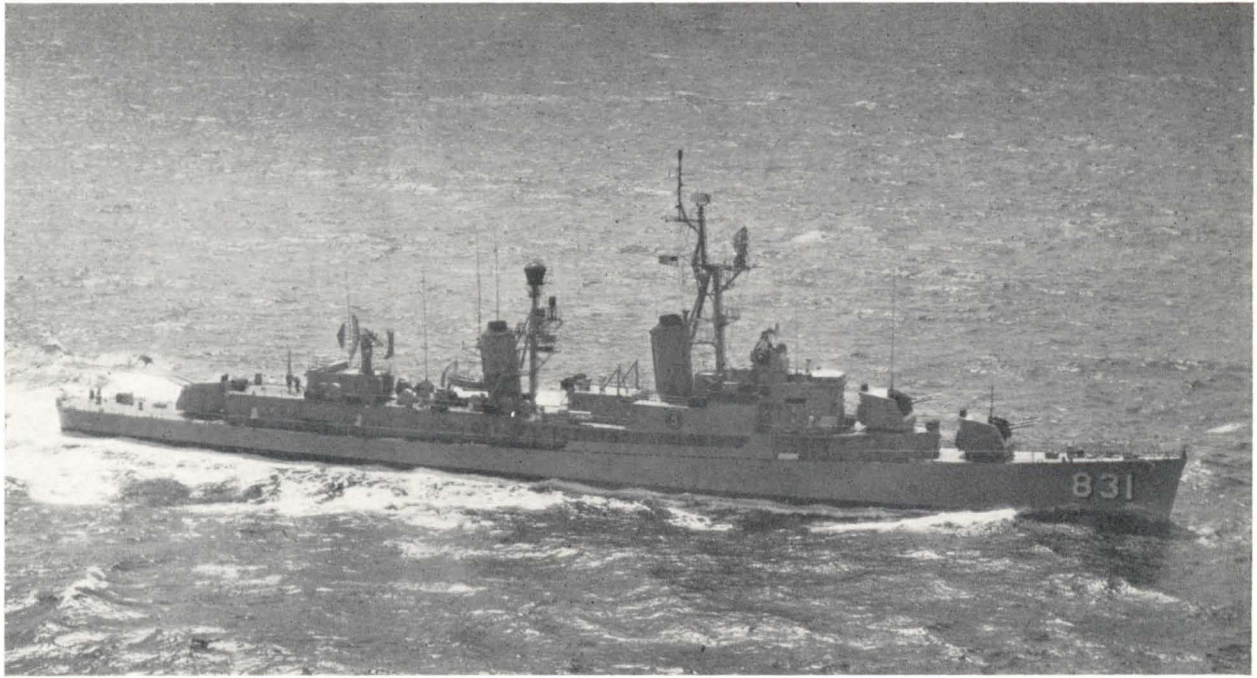
BENNER	**EUGENE A. GREENE**	**HENRY W. TUCKER**	**PERKINS**
BORDELON	**EVERRET F. LARSEN**	**HERBERT J. THOMAS**	**ROGERS**
CHARLES P. CECIL	**FECHTELER**	**HIGBEE**	**SOUTHERLAND**
CHEVALIER	**FISKE**	**KENNETH D. BAILEY**	**STEINAKER**
CORRY	**FRANK KNOX**	**LEARY**	**STICKELL**
DENNIS J. BUCKLEY	**FURSE**	**McKEAN**	**TURNER**
DUNCAN	**GOODRICH**	**MYLES C. FOX**	**VESOLE**
DYESS	**HANSON**	**NEWMAN K. PERRY**	**WILLIAM M. WOOD**
ERNEST G. SMALL	**HAWKINS**	**O'HARE**	**WILLIAM R. RUSH**

A development of the "Gearing" class, the necessity for these ships arose in the later stages of the war in the Pacific. Increasing aircraft speeds and suicide bombers demanded the greatest possible warning of approach, so these ships had their torpedo mountings removed and a tripod mainmast fitted to carry an imposing array of radar aerials. Ships were disposed in an extended screen many miles from the main fleet in order to give as early a warning as possible of the approach of aircraft. In some ships the tripod mainmast has now been removed and the aerials are mounted on the after superstructure. *Bordelon* has a new style of mainmast on the fore side of the after funnel. All the thirty-six ships listed above were completed in 1944–6. A number of them have recently undergone FRAM conversion and are equipped with DASH (Drone Anti-submarine Helicopter) installation and variable depth sonar. The particulars given below apply before conversion.

Standard displacement	*Full load displacement*	*Length*	*Beam*	*Draught*
2,425 tons	3,550 tons	390½ feet	41 feet	19 feet

Main guns	*Anti-aircraft guns*	*Anti-submarine weapons*	*Complement*
6–5 inch	6–3 inch	2 Hedgehogs, 2 side-launching torpedo racks	305

Propelling machinery	*Shaft horse power*	*Boilers*	*Speed*
Geared steam turbines	60,000	4	35 knots

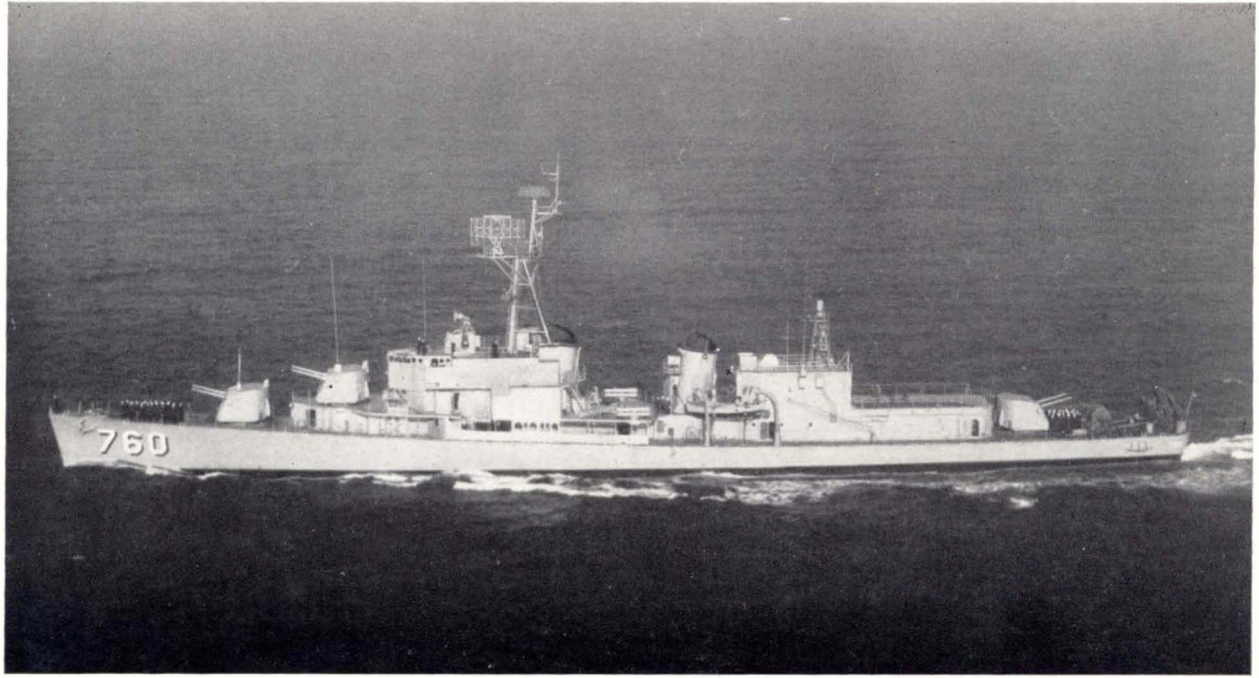


GOODRICH

ALFRED A. CUNNINGHAM	**DE HAVEN**	**JAMES C. OWEN**	**PURDY**
ALLEN M. SUMNER	**DOUGLAS H. FOX**	**JOHN A. BOYLE**	**PUTNAM**
AULT	**ENGLISH**	**JOHN R. PIERCE**	**ROBERT K. HUNTINGTON**
BARTON	**FRANK E. EVANS**	**JOHN W. THOMASON**	
BEATTY	**GAINARD**	**JOHN W. WEEKS**	**SOLEY**
BLUE	**HANK**	**LAFFEY**	**STORMES**
BORIE	**HARLAN R. DICKSON**	**LOFBERG**	**STRONG**
BRISTOL	**HARRY E. HUBBARD**	**LOWRY**	**SAMUEL L. MOORE**
BRUSH	**HAYNSWORTH**	**LYMAN K. SWENSON**	**TAUSSIG**
BUCK	**HENLEY**	**MADDOX**	**WALDRON**
CHARLES H. SPERRY	**HUGH PURVIS**	**MANSFIELD**	**WALKE**
COLLETT	**HYMAN**	**MASSEY**	**WALLACE L. LIND**
COMPTON	**INGRAHAM**	**MOALE**	**WILLARD KEITH**
		O'BRIEN	**ZELLARS**

Known as the "Allen M. Sumner" class, and constituting a shorter, earlier version of the "Gearing" type, these ships were the first twin turret destroyers in the American Navy. A number of them have recently undergone FRAM II conversion with DASH platform aft, and from these the quintuple torpedo tubes and 3-inch guns are removed. *Adams*, *Gwin*, *Harry F. Bauer*, *Henry A. Wiley*, *Lindsey*, *Robert H. Smith*, *Shannon*, *Shea*, *Thomas E. Fraser* and *Tolman*, originally of this class, are rated as destroyer minelayers (DM).

Standard displacement	*Full load displacement*	*Length*	*Beam*	*Draught*
2,200 tons	3,300 tons	376½ feet	40¾ feet	19 feet
Main guns	*Anti-aircraft guns*	*Torpedo tubes*	*Anti-submarine weapons*	
6–5 inch	6–3 inch	5–21 inch	2 hedgehogs, 2 side-launching torpedo racks	
Propelling machinery	*Shaft horse power*	*Boilers*	*Speed*	*Complement*
Geared steam turbines	60,000	4 Babcock & Wilcox	34 knots	250



JOHN W. THOMASON

ALBERT W. GRANT	**COGSWELL**	**INGERSOLL**	**MONSSEN**
BEARSS	**CALAHAN**	**IRWIN**	**NORMAN SCOTT**
BENNION	**COTTEN**	**JOHN WOOD**	**PICKING**
BLACK	**DASHIELL**	**KIDD**	**PORTER**
BULLARD	**GATLING**	**KNAPP**	**PORTERFIELD**
BRYANT	**GREGORY**	**LEWIS HANCOCK**	**PRESTON**
CAPERTON	**HALSEY POWELL**	**McDERMUT**	**REMEY**
CASSIN YOUNG	**HEALY**	**McNAIR**	**STOCKHAM**
CHARLES J. BADGER	**HICKOX**	**MARSHALL**	**UHLMAN**
CHAUNCEY	**HOPEWELL**	**MELVIN**	**VAN VALKENBURGH**
CLARENCE K. BRONSON	**HUNT**	**MERTZ**	**WEDDERBURN**

This group is known as the Later "Fletcher" class. Practically identical with the original "Fletcher" class, these vessels were, with the "Fletcher" type, the first war-construction destroyers built for the United States Navy. Some units still retain two sets of tubes, ten in all; a number of units have lost the midships 5-inch gun and mount six 3-inch guns and a director in lieu of the 5-inch and 40-mm. mounts. Only reserve units now have 20 mm. As in all destroyers, a tripod foremast was fitted to take the weight of radar arrays. Of this class *Heywood L. Edwards* and *Richard P. Leary* were transferred to Japan in 1959; *Benham* to Peru in 1960; *Jarvis* and *McGowan* to Spain in 1960; *Cushing* to Brazil in 1961; *Dortch* to Argentina in 1961; and *Rooks* and *Wadleigh* to Chile in 1962.

Standard displacement	*Full load displacement*	*Length*	*Beam*	*Draught*
2,050 tons	3,050 tons	376½ feet	39½ feet	18 feet
Main guns	*Anti-aircraft guns*		*Torpedo tubes*	*Complement*
5–5 inch or 4–5 inch	10–40 mm., 8–20 mm. or 6–3 inch		5 or 10–21 inch	250
Propelling machinery	*Shaft horse power*		*Boilers*	*Speed*
Geared steam turbines	60,000		4 Babcock & Wilcox	35 knots

COTTEN

ABBOTT	**HARADEN**	**LAWS**	**ROWE**	**THE SULLIVANS**
BELL	**HARRISON**	**METCALF**	**SCHROEDER**	**TINGEY**
BOYD	**HART**	**MILLER**	**SHIELDS**	**TRATHEN**
BRAINE	**HAZELWOOD**	**MULLANY**	**SIGOURNEY**	**TWINING**
BURNS	**HUDSON**	**McCORD**	**SIGSBEE**	**WATTS**
COWELL	**IZARD**	**McKEE**	**SMALLEY**	**WICKES**
DALY	**JOHN D. HENLEY**	**OWEN**	**STANLEY**	**WILEY**
ERBEN	**JOHN RODGERS**	**PAUL HAMILTON**	**STEPHEN POTTER**	**WREN**
FOOTE	**KILLEN**	**PRICHETT**	**STEVENS**	**YARNALL**
FRANKS	**KIMBERLEY**	**ROBINSON**	**STODDARD**	**YOUNG**
HALFORD	**LA VALETTE**	**ROSS**	**TERRY**	

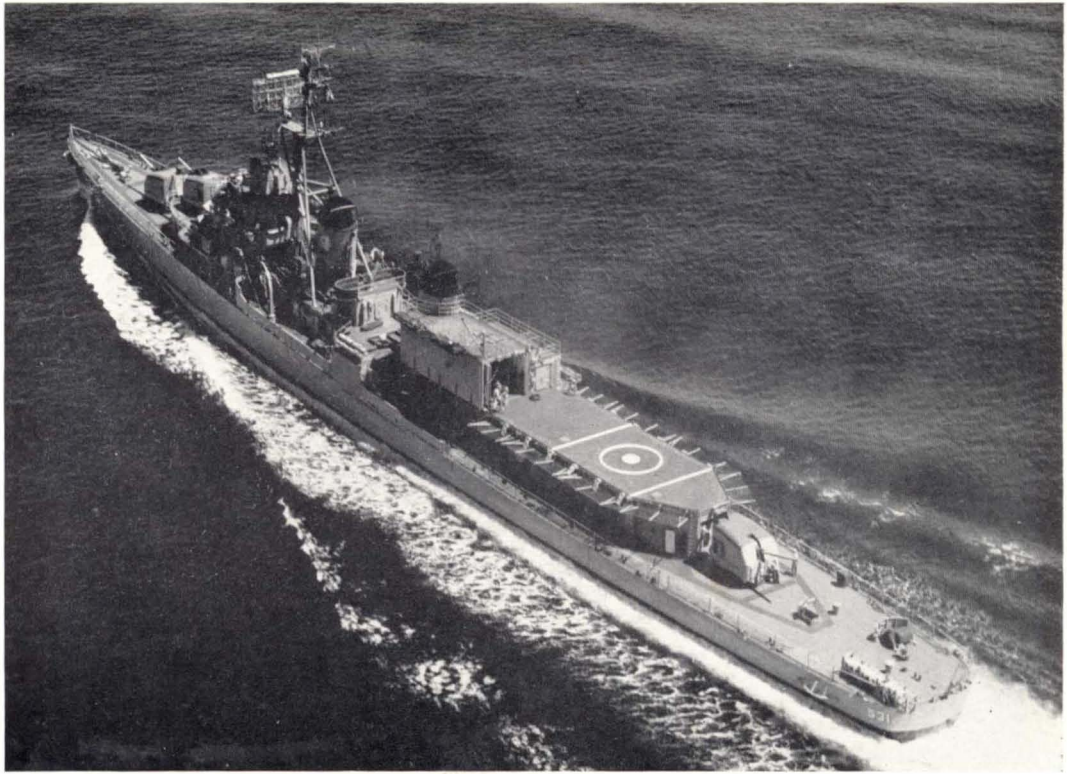
Original "Fletcher" class. Several have been rearmed with the new 3-inch gun in lieu of the smaller A.A. mounts. During the war, six units were equipped with a catapult and seaplane, some of the very few destroyers ever to be so equipped. Pole mast was replaced with a tripod. In 1957–62 *Anthony*, *Charles Ausburn*, *Claxton*, *Dyson*, *Ringgold* and *Wadsworth* were transferred to the German Federal Republic, *Capps*, *Converse* and *David W. Taylor* to Spain, *Aulick*, *Bradford*, *Brown*, *Charrette*, *Conner* and *Hall* to Greece, and *Bennett*, *Guest* and *Hailey* to Brazil, *Hale* to Colombia, *Heerman* and *Stembel* to Argentina, *Isherwood* to Peru, and *Ammen*, *Fullam* and *Howorth* were disposed of.

Standard displacement	*Full load displacement*	*Length*	*Beam*	*Draught*
2,100 tons	3,050 tons	376½ feet	39½ feet	18 feet

Main guns	*Anti-aircraft guns*	*Torpedo tubes*	*Complement*
5 or 4–5 inch	6–40 mm., 10–20 mm. or 6–3 inch	5 or 10–21 inch	305

Propelling machinery	*Shaft horse power*	*Boilers*	*Speed*
Geared steam turbines	60,000	4 Babcock & Wilcox	35 knots

HAZLEWOOD



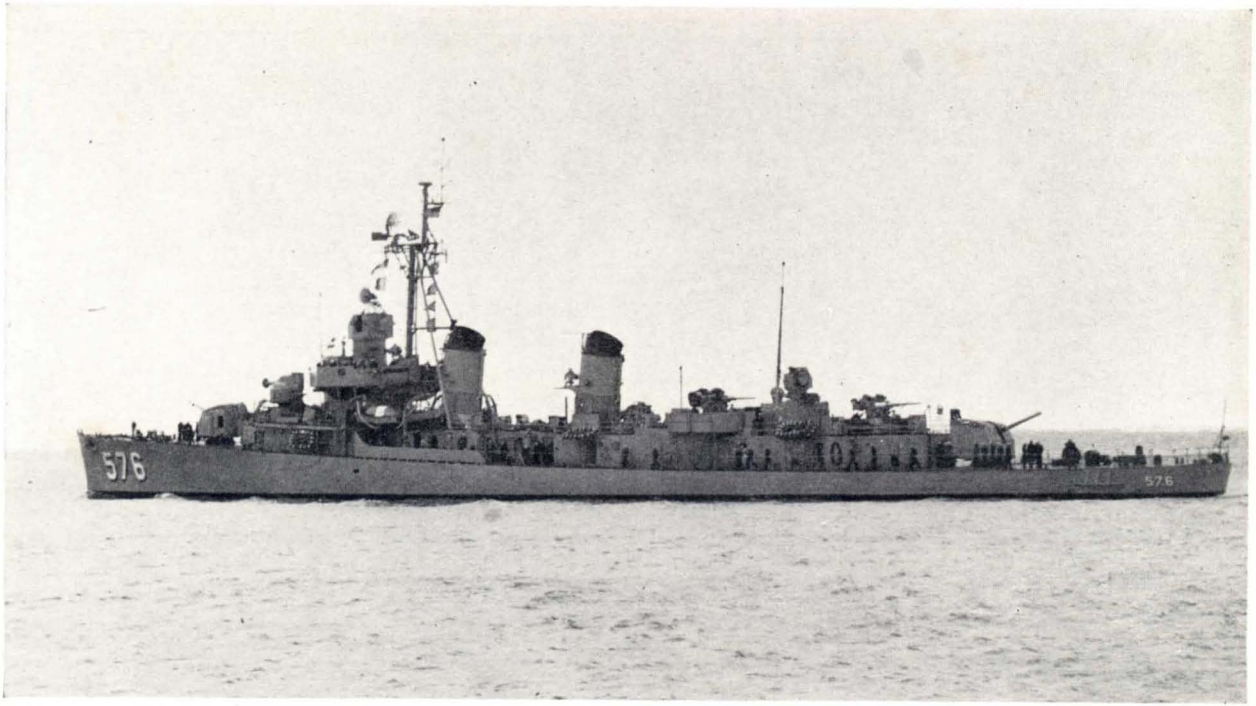
BACHE	**CONY**	**JENKINS**	**O'BANNON**	**RENSHAW**	**TAYLOR**
BEALE	**EATON**	**MURRAY**	**PHILIP**	**SAUFFLEY**	**WALKER**
CONWAY	**FLETCHER**	**NICHOLAS**	**RADFORD**	**SPROSTON**	**WALLER**

Former fleet destroyers, like units of the "Fletcher" class previously described, these ships were converted to provide close support units for convoy escorts. There are some slight differences between ships: one vessel has no tubes, various others have not yet been fitted with the new-pattern tripod foremast. This class has a comprehensive anti-submarine armament. There is an ahead-throwing rocket launcher in place of the former "B" turret, or a trainable hedgehog, a depth charge rack, two side-launching torpedo racks, and two fixed hedgehogs which have been installed on the port and starboard sides of the forward shelter deck below the bridge wings. The *Sauffley* was equipped as an experimental escort destroyer (EDDE) with one 5-inch gun, two 3-inch anti-aircraft guns and no torpedo tubes. All eighteen of the ships listed above were completed in 1942–3. *Jenkins*, *Nicholas* and *Radford* underwent FRAM II conversion (Fleet Rehabilitation and Modernisation) in 1960, with DASH, helodeck and hangar for two drones, and ASW torpedo launchers, a nest of three on each side; and the 3-inch guns were removed. *Jenkins* is fitted with VDS (variable depth sonar) on the stern. The whole class of eighteen ships were again redesignated as DD in 1962.

Standard displacement	*Full load displacement*	*Length*	*Beam*	*Draught*
2,080 tons	2,940 tons	376½ feet	39½ feet	18 feet

Main guns	*Anti-aircraft guns*	*Anti-submarine weapons*	*Torpedo tubes*	*Complement*
2–5 inch	4–3 inch	1 rocket launcher, 2 side torpedo racks, 2 Hedgehogs	4–21 inch fixed	300

Propelling machinery	*Shaft horse power*	*Boilers*	*Speed*
Geared steam turbines	60,000	4 Babcock & Wilcox	35 knots



MURRAY

CARMICK	**EDISON**	**GHERARDI**	**KEARNEY**	**QUICK**	**THORN**
COWIE	**EDWARDS**	**GLEAVES**	**KNIGHT**	**SATTERLEE**	**TILLMAN**
DAVISON	**ENDICOTT**	**GRAYSON**	**McCOOK**	**STEVENSON**	**WELLES**
DORAN	**ERICSSON**	**HAMBLETON**	**MERVINE**	**STOCKTON**	**WILKES**
DOYLE	**FITCH**	**HERNDON**	**NELSON**	**SWANSON**	**WOOLSEY**
EARLE	**FRANKFORD**	**JEFFERS**	**NIBLACK**	**THOMPSON**	

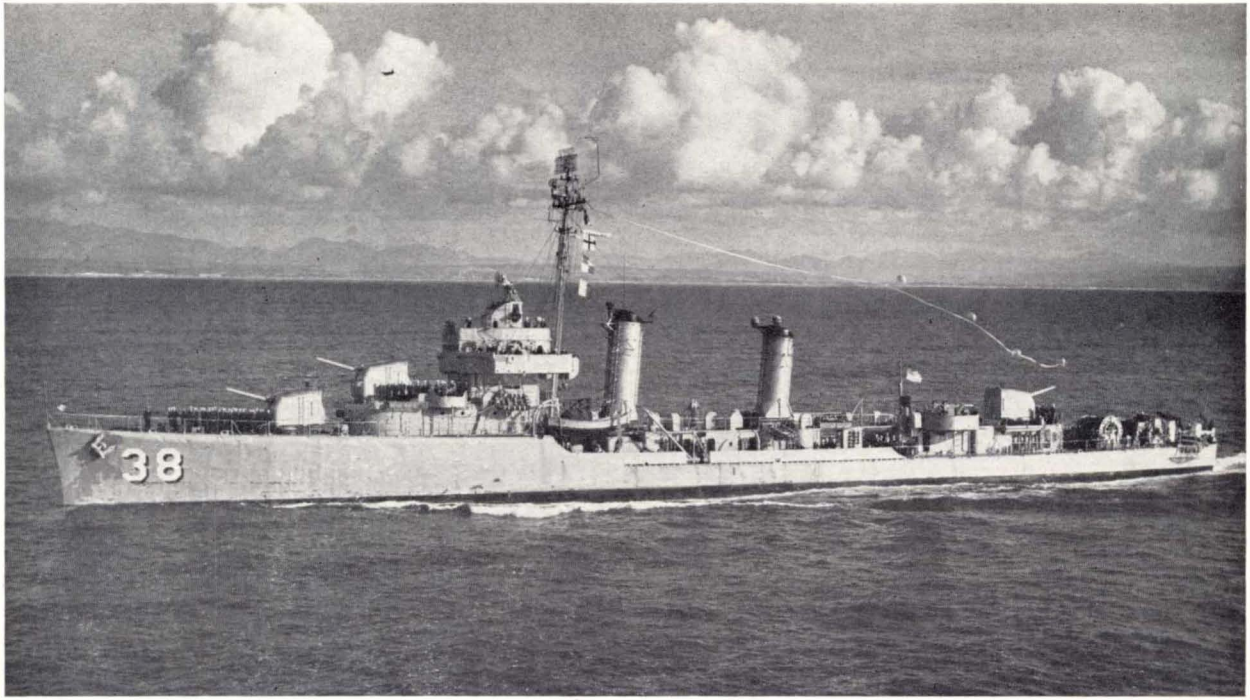
BAILEY	**CHAMPLIN**	**FRAZIER**	**KALK**	**MACKENZIE**	**MURPHY**
BANCROFT	**CHARLES F. HUGHES**	**GANSEVOORT**	**KENDRICK**	**MADISON**	**NIELDS**
BOYLE	**COGHLAN**	**GILLESPIE**	**LAUB**	**MAYO**	**ORDRONAUX**
CALDWELL	**FARENHOLT**	**HOBBY**	**McLANAHAN**	**MEADE**	**PARKER**

A widely distributed and varied class of ships. Eleven former units of the "Gleaves" class were transferred to the Turkish, Italian, Greek, Nationalist Chinese and Japanese navies. *Baldwin* was disposed of in 1961. The ships formerly of this type, converted to High-Speed Minesweepers (DMS) with the removal of one after 5-inch gun and the torpedo tubes, reverted to the destroyer status and designation in 1955. A very similar type of ships are the twenty-four vessels of the "Mayo" class, indistinguishable in detail from the "Gleaves" class. One vessel of this earlier type transferred to Italy, and two vessels to Nationalist China.

Standard displacement	*Full load displacement*	*Length*	*Beam*	*Draught*
("35 Gleaves" class) 1,700 tons	2,580 tons	348¼ feet	36 feet	18 feet
("24 Mayo" class) 1,620 tons	2,575 tons		35¼ feet	

Main guns	*Anti-aircraft guns*	*Torpedo tubes*	*Complement*
4–5 inch 3–5 inch (ex-DMS)	4–40 mm., 7–20 mm.	5–21 inch	250

Propelling machinery	*Shaft horse power*	*Boilers*	*Speed*
Geared steam turbines	50,000	4 Babcock & Wilcox	36.5 knots



K

THOMPSON

4 "KYNDA" CLASS **8 "KRUPNYI" CLASS** **5 "KILDIN" CLASS**

The "Kynda" class of guided missile armed destroyers represent a new type, and are a logical development of the earlier types of Soviet destroyers fitted with guided weapons. Building to this design is believed to have commenced in 1961 and the first two units are reported to have been launched at Zhdanov Yard, Leningrad, the same year. Their appearance is similar to that of the "Krupnyi" class, but they have heavy lattice masts with funnels close up to them. In 1963 it was reported that several units had been launched.

The "Krupnyi" class are a new type of flush-decked destroyers designed to carry guided missiles. Long, slim and low-lying, they have an attenuated, lithe and rakish appearance without a preponderance of heavy superstructure, but their sea-to-air launchers for guided missiles, mounted both forward and aft are most conspicuous. They have a helicopter spot landing apron on the stern. Initial construction is said to have commenced in 1958 at Leningrad. Later units are also reported to be fitted with surface-to-surface missile launchers. Nos. 526, 700 and 703 have been observed.

The "Kildin" class are large destroyers of the "Kotlin" type reported to have been redesigned as guided missile armed destroyers, with a launcher installed in place of the after gun mountings. Their identification as the "Kildin" class is by NATO designation. The first of the class, squat and racy in appearance, but withal much heavier looking and more built up aft, is reported to have commissioned in 1958. At least one of the completed units are reported to be in the Baltic Fleet. Nos. 165 and others have been observed.

Standard displacement	*Full load displacement*	*Length*	*Beam*	*Draught*
"Kynda" Class 3,900 tons	4,900 tons	466 feet	46⅔ feet	16½ feet
"Krupnyi" Class 3,500 tons	4,500 tons	453 feet	44 feet	16½ feet
"Kildin" Class 3,000 tons	4,000 tons	423¼ feet	43⅓ feet	15½ feet

Guided weapons	*Guns*	*Torpedo tubes*
"Kynda" Class: s-to-s forward and s-to-a	57 mm. anti-aircraft	21 inch
"Krupnyi" Class: s-to-a forward and aft	16–57 mm. A.A., 4–37 mm. A.A.	6 (two triple)
"Kildin" Class: s-to-s launcher aft	2–3.9 inch d.p., 12–57 mm. A.A.	10–21 inch

Propelling machinery	*Shaft horse power*	*Boilers*	*Speed*	*Complement*
Geared steam turbines	100,000	3 high pressure	38 knots	390
(all three classes)	100,000	3 high pressure	38 knots	360
two shafts	80,000	3 high pressure	38 knots	300

KILDIN CLASS

27 "KOTLIN" CLASS

1 "TALLINN" CLASS

The prototype of this new flush-decked semi-leader or fleet type of large destroyers was first observed about 1955. Known as the "Tallinn" class, the first unit carried several pennant numbers including 76 and 778. The displacement was variously reported to be from 3,100 to 3,500 tons. The 3.9-inch guns in twin turrets are similar to those mounted as secondary armament in the "Sverdlov" class cruisers, including firing directors and control position, fully stabilised, forming a part of the bridge and mast. This was the first time that such an arrangement had been contrived in a ship of destroyer size, and experiment in top weight.

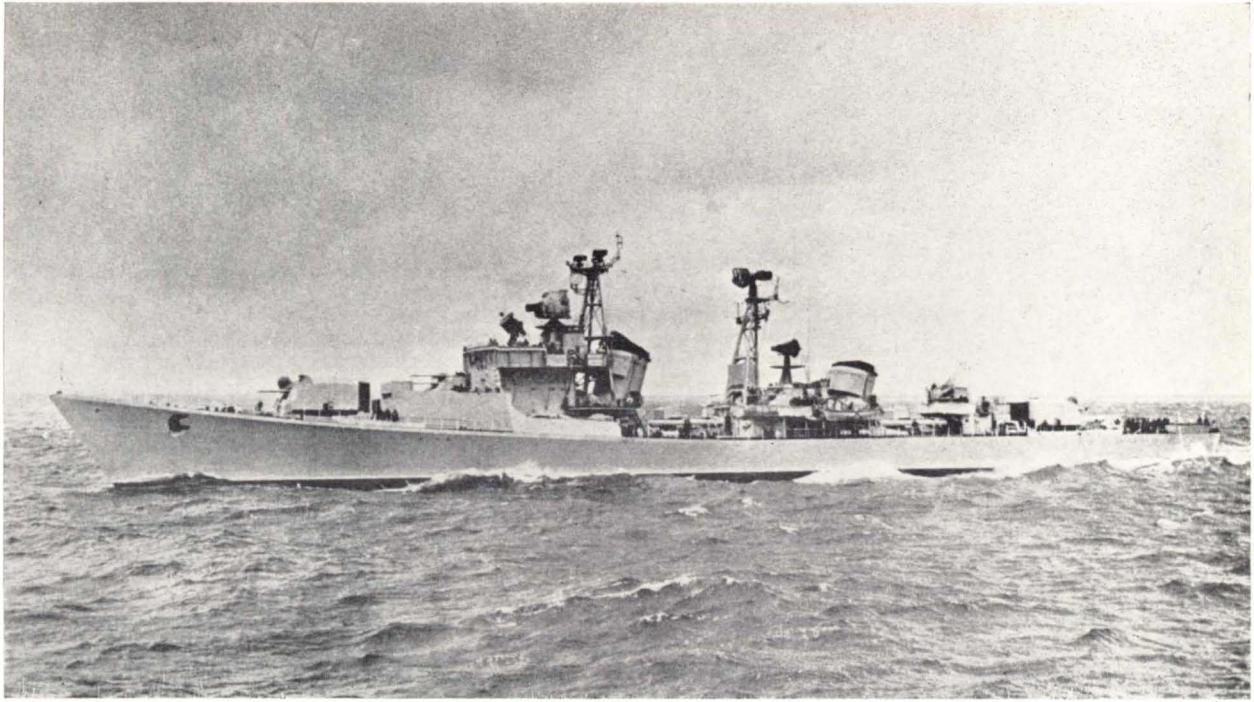
The "Kotlin" class, reported to number twenty-seven units, are improved versions of the "Tallinn" type with similar hulls but differing features. This new class of fast anti-aircraft and anti-submarine destroyers was apparently designed for mass production, numbers observed including 32, 75, 77, 78, 79, 82, 86, 95, 502 and 774. It is reported that the six depth charge throwers are mounted on rotating platforms on the stern. Particulars of the "Kotlin" class are given below.

It is reported that the U.S.S.R. is converting many units of the "Kotlin" class in a programme similar to the U.S. Navy's FRAM programme, with extensive modifications in anti-submarine warfare, electronics and anti-aircraft armament. Several of the class are fitted with a helicopter platform abaft the after mounting, and at least one ship is fitted with a surface-to-air twin missile launcher aft.

Standard displacement	*Full load displacement*	*Length*	*Beam*	*Draught*
2,850 tons	3,885 tons	425 feet	41½ feet	16 feet

Main guns	*Anti-aircraft guns*	*Torpedo tubes*	*Anti-submarine armament*
4–3.9 inch	16–57 mm.	10–21 inch	6 side-thrown depth charge projectors

Propelling machinery	*Shaft horse power*	*Boilers*	*Speed*	*Complement*
Geared steam turbines	80,000	4	38 knots	285



"KOTLIN" Class

BDITYELNI	**OBRAZOVANNY**	**OZHESTOCHONNI**	**SOVERSHENNI**	**VEDUSHCHII**
BEZSHUMNI	**OCHAYANI**	**OZHIVLENNYI**	**SPOSOBNI**	**VERNI**
BEZSLEDNI	**OGNENNI**	**OZLOBLIONNY**	**STATNI**	**VIDNI**
BEZSMENNI	**OSMYSLENNI**	**SERDITI**	**STEPENNI**	**VIKHREVOI**
BEZSPOKOINI	**OSNOVATELNY**	**SEREZNI**	**STOIKI**	**VNEZAPNYI**
BEZSTRASHNI	**OSTERVENELI**	**SMELI**	**STREMITELNI**	**VNIMATELNYI**
BEZUKORIZNENNI	**OSTOROZHNYI**	**SMOTRYASHCHI**	**SUROVI**	**VOLEVOI**
BODRI	**OSTROGLAZY**	**SMYSHLYONI**	**SVOBODNI**	**VOZBUZHDONNI**
BOIKI	**OTRETOVENNI**	**SOKRUSHYTELNI**	**VAZINI**	**VRAZUMITELNI**
BYSTRI	**OTVETSVENNI**	**SOLIDNI**	**VDUMCHIVI**	**VYDERZHANNYI**
		SOOBRAZITELNI		

The "Skori" class destroyers are, like all major Russian warships, equipped for minelaying. Handsome-looking vessels with a low raking silhouette, the first units were observed during 1953. Names are uncertain, some may be numbered only. There were to have been 85 destroyers of this class, but their construction beyond 72 units is reported to have been discontinued in favour of later types of destroyers. Many units of the "Skori" class are being converted under a fleet rehabilitation and modernisation programme with extensive alterations to anti-aircraft armament, electronics and anti-submarine weapons.

Standard displacement	*Full load displacement*	*Length*	*Beam*	*Draught*
2,600 tons	3,500 tons	420 feet	41 feet	13¼ feet
Main guns	*Anti-aircraft guns*	*Torpedo tubes*	*Mines*	*Anti-submarine weapons*
4–5.1 inch	2–3 inch, 6 to 10–37 mm.	10–21 inch	80	Depth charges
Propelling machinery	*Shaft horse power*	*Boilers*	*Speed*	*Complement*
Geared turbines	70,000	3	38 knots	250

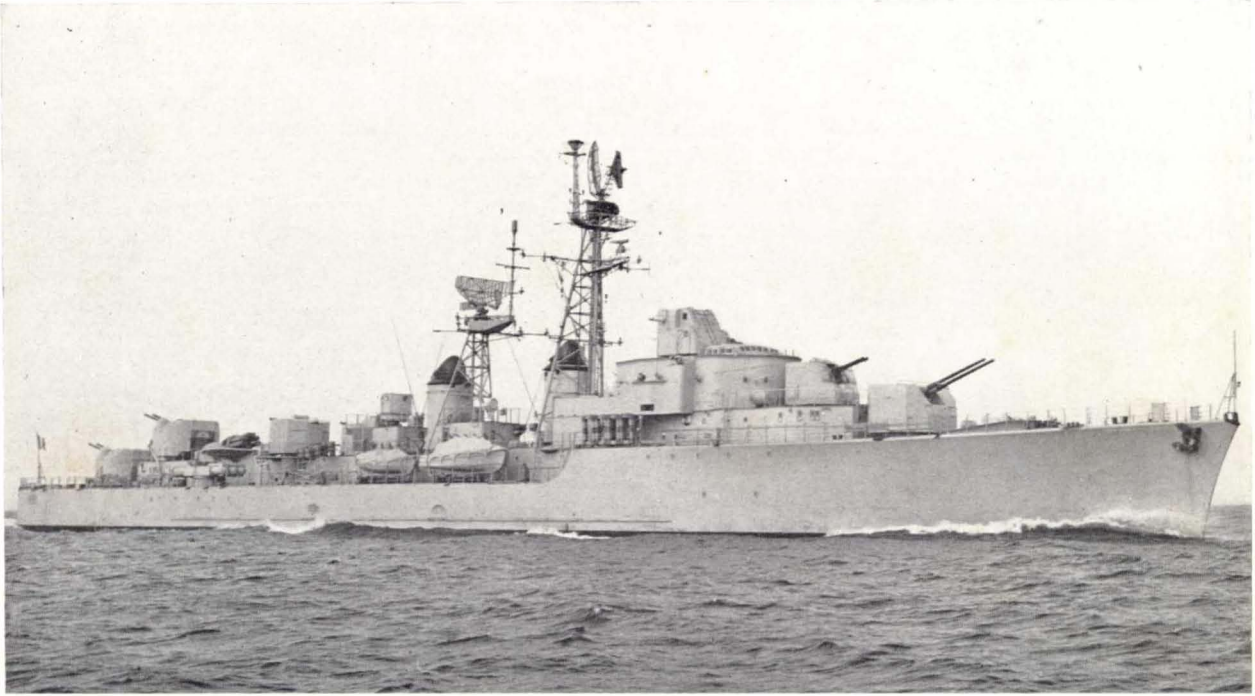
Note: There are also 11 destroyers of the "Otlichnyi" class; 8 of the "Ryanyi" class; 8 of the "Silnyi" class; 5 of the "Gromki" class; and three of the "Leningrad" class (see full particulars in the 1960 Edition, pages 164 and 165) now overage or obsolescent and therefore omitted from this issue.

SVOBODNI

BOUVET	**DU CHAYLA**	**JAUREGUIBERRY**	**MAILLE BREZE**
CASABIANCA	**DUPETIT THOUARS**	**KERSAINT**	**SURCOUF**
CASSARD	**DUPERRE**	**LA BOURDONNAIS**	**TARTU**
CHEVALIER PAUL	**FORBIN**	**LA GALISSONIERE**	**VAUQUELIN**
D'ESTREES	**GUEPRATTE**		

The first post-war French destroyers, these mount the 57-mm. gun, a new French calibre, somewhat similar to the United States 3-inch gun. The 5-inch gun was adopted for the first time in the French Navy to facilitate ammunition supply, as it takes the standard U.S. Navy ammunition. Of the twelve torpedo tubes, six are designed to fire the special anti-submarine homing torpedoes that search for and home on any submarine in the vicinity. The remaining six tubes can handle either anti-submarine or conventional torpedoes. The 5-inch armament is disposed with one turret forward on forecastle deck level and two aft. The ships are entirely welded. The last ship of this group of 18 units, *La Galissoniere*, of the anti-submarine type, was designed as a command ship and squadron leader, and has a reduced main armament of two 3.9-inch automatic anti-aircraft guns, but carries a helicopter and "Malafon" guided weapons. The *Duperré*, *Forbin*, *Jaureguiberry*, *La Bourdonnais* and *Tartu* are of the aircraft direction type for use as radar picket destroyers. The remainder are of the anti-aircraft type. Four of these are being re-armed with "Tartar" guided weapons and the other eight with "Malafon" guided weapons. All except *La Galissoniere* (in 1962) were completed in 1955–58.

Standard displacement	*Full load displacement*	*Length*	*Beam*	*Draught*
2,750 tons	3,750 tons	422 feet	41⅔ feet	17¾ feet
Main guns	*Anti-aircraft guns*	*Guided weapons*	*Torpedo tubes*	*Anti-submarine weapons*
6–5 inch	6–57 mm., 6–20 mm.	1 launcher for "Malafon"	12–21.7 inch	2–12 inch mortars
2–3.9 inch in *La Gal.*	2–30 mm. in *La Gal.*	or "Tartar" missiles	6 in *Duperré* class	A/S Torpedoes or Hedgehog
Propelling machinery	*Shaft horse power*	*Boilers*	*Speed*	*Complement*
Geared steam turbines	63,000	4	34 knots	347 (335 in *La Gal.*)



DUPERRÉ

IMPAVIDO **IMPETUOSO** **INDOMITO** **INTREPIDO**

Impetuoso and *Indomito* were the first destroyers designed and built in Italy since the end of the Second World War. They are large vessels with special anti-submarine and heavy anti-aircraft armament, rated as *Caccia Torpediniere* and designated DD. On their sea trials they attained a speed of 35 knots at full load. The armament of the *Impavido* and *Intrepido* includes a "Tartar" surface-to-air guided missile twin launcher aft; provision has been made for carrying one or two light anti-submarine helicopters; and the machinery will be of a different type. They are designated DDG, and will be classed as *Caccia Lanciamissili* on completion.

	Standard displacement	*Full load displacement*	*Length*	*Beam*	*Draught*
Impetuoso, Indomito:	2,775 tons	3,811 tons	418⅔ feet	43½ feet	17½ feet
Impavido, Intrepido:	3,201 tons	3,941 tons	429½ feet	44⅔ feet	14¾ feet

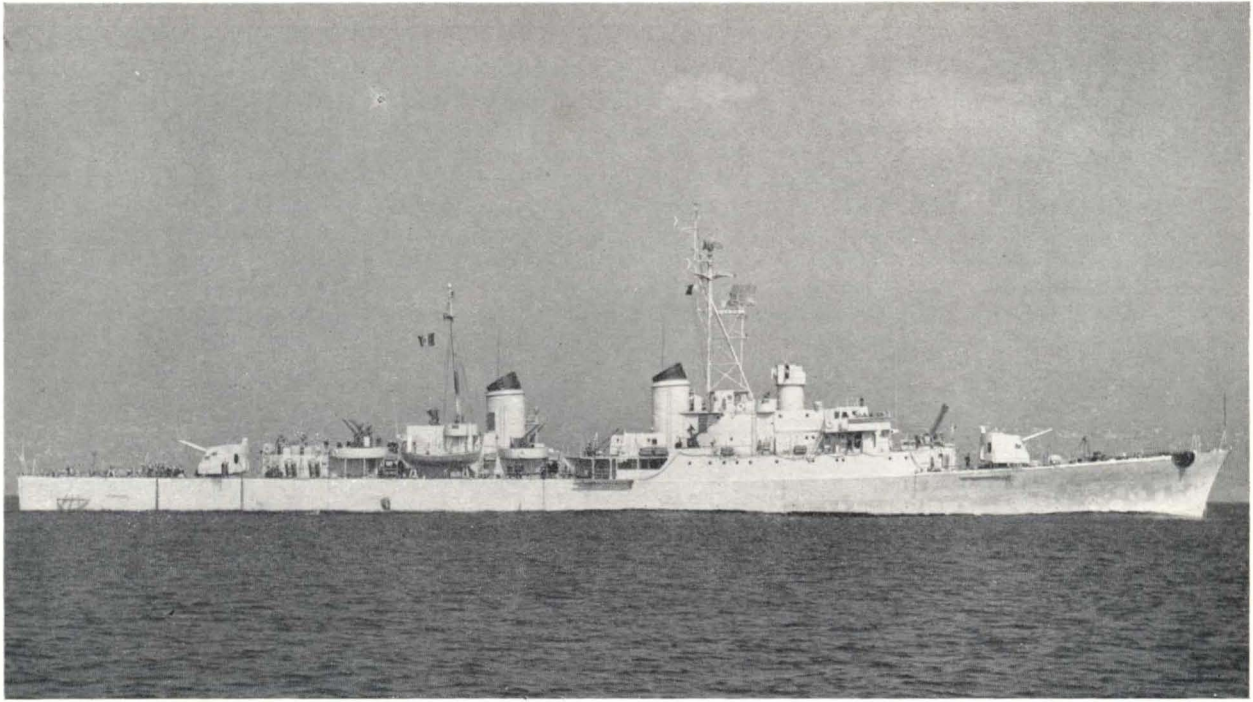
Main guns	*Anti-aircraft guns*	*Torpedo tubes*	*Anti-submarine weapons*	*Guided weapons*
4–5 inch	16–40 mm.	2–21 inch	Triple mortar	
2–5 inch	4–3 inch	2 triple fixed	Single howitzer	Twin "Tartar" launcher

Propelling machinery	*Shaft horse power*	*Boilers*	*Speed*	*Complement*
Geared steam turbines	60,000	4 Foster-Wheeler	34 knots	350
Geared steam turbines	70,000	4	33.5 knots	344

Name	*Begun*	*Launched*	*Completed*	*Builders*
IMPAVIDO	10 June 1957	25 May 1962		Cantieri del Tirreno, Riva Trigoso
INTREPIDO	16 May 1959	21 Oct. 1962		Ansaldo, Leghorn (formerly O.T.O. Yard)
IMPETUOSO	7 May 1952	16 Sep. 1956	25 Jan. 1958	Cantieri del Tirreno, Riva Trigoso
INDOMITO	24 Apr. 1952	7 Aug. 1955	23 Feb. 1958	Ansaldo, Leghorn (formerly O.T.O. Yard)

Note: Two other Italian destroyers are the *Artigliere* (ex-U.S.S. *Woodworth*) and *Aviere* (ex-U.S.S. *Nicholson*) of the "Gleave " and "Mayo" classes, respectively, particulars of which are given in the U.S. pages.

The only remaining units of the pre-war Italian destroyers are the *Carabiniere*, now used as an auxiliary experimental ship (sister ship *Granatiere* was removed from the effective list in 1958) and *Grecale*, converted into a command ship.



IMPETUOSO

GELDERLAND NOORD BRABANT AMSTERDAM GRONINGEN FRIESLAND ROTTERDAM
HOLLAND ZEELAND DRENTHE LIMBURG OVERIJSSEL UTRECHT

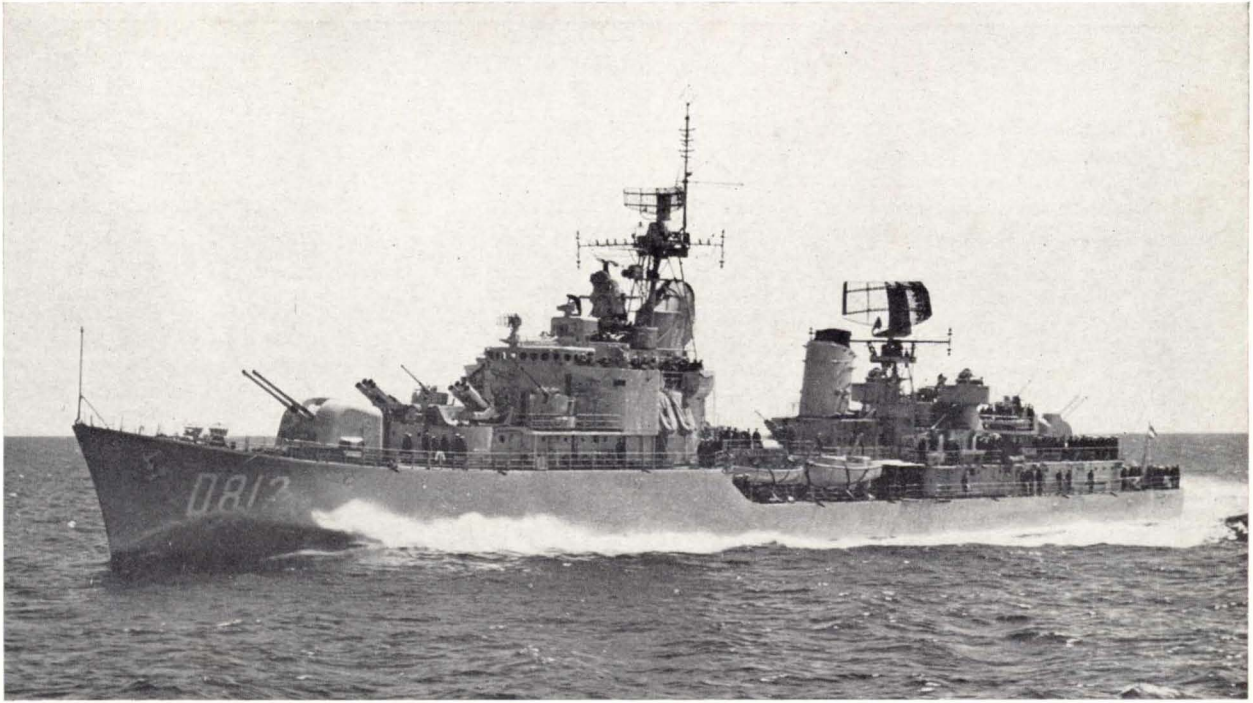
The anti-submarine vessels of the "Holland" class, comprising the *Gelderland*, *Holland*, *Noord Brabant* and *Zeeland*, were the first destroyers built for the Royal Netherlands Navy after the Second World War. They were laid down in 1950–51, launched in 1953, and completed in 1954–55. The succeeding group of eight ships constitute the "Friesland" class. These larger fleet escorts have some side armour as well as deck protection, like light cruisers. Named after the provinces of Northern and Southern Holland and the two biggest towns, they were laid down in 1951–55, launched in 1953–56 and completed in 1956–58. Unlike most orthodox destroyers these two classes have no torpedo tubes, but they have "Limbo" type four-barrelled anti-submarine rocket throwers or depth charge mortars. Their 4.7-inch guns are fully automatic and radar controlled, and have a rate of fire of 50 rounds per minute. The special features of these ships are the large radar aerials surmounting the squat lattice masts, and the cowled fore funnel curving back from inside the foremast.

Standard displacement	*Full load displacement*	*Length*	*Beam*	*Draught*
"Holland" class 2,215 tons	2,765 tons	371 feet	37½ feet	12½ feet
"Friesland" class 2,497 tons	3,070 tons	380½ feet	38½ feet	13 feet

Main guns	*Anti-aircraft guns*	*Anti-submarine weapons*	*Complement*
4–4.7 inch	1–40 mm.	2–4 barrelled depth charge mortars	246
4–4.7 inch	6–40 mm.	2–4 barrelled depth charge mortars	283

Propelling machinery	*Shaft horse power*	*Boilers*	*Speed*
Geared steam turbines	45,000	2 Babcock & Wilcox	32 knots
Geared steam turbines	60,000	2 Babcock & Wilcox	36 knots

Builders:—Dok-en-Werfmaatschappij Wilton-Fijenoord, Schiedam: *Gelderland* and *Overijssel*; Koninklijke Maatschappij De Schelde, Flushing: *Limburg*, *Noord Brabant*, *Utrecht* and *Zeeland*; Nederlandse Dok en Scheepsbouw Mij., Amsterdam: *Amsterdam*, *Drenthe*, *Friesland* and *Groningen*; Rotterdamse Droogdok Mij., Rotterdam: *Holland* and *Rotterdam*.



FRIESLAND

HALLAND **GASTRIKLAND** **ÖSTERGÖTLAND**
SMALAND **HALSINGLAND** **SODERMANLAND**

Halland and *Smaland* were the first Swedish destroyers of post-Second World War design. They have fully automatic gun turrets, ahead throwing anti-submarine weapons on the forecastle, low silhouette, massive block bridge tower, and truncated conical funnels. The remaining four ships have basically the same characteristics but with somewhat thinner funnels, flush-deck, and the mainmast stepped before the after funnel, whereas the "Halland" class have a forecastle and a diminutive mainmast well abaft the after funnel.

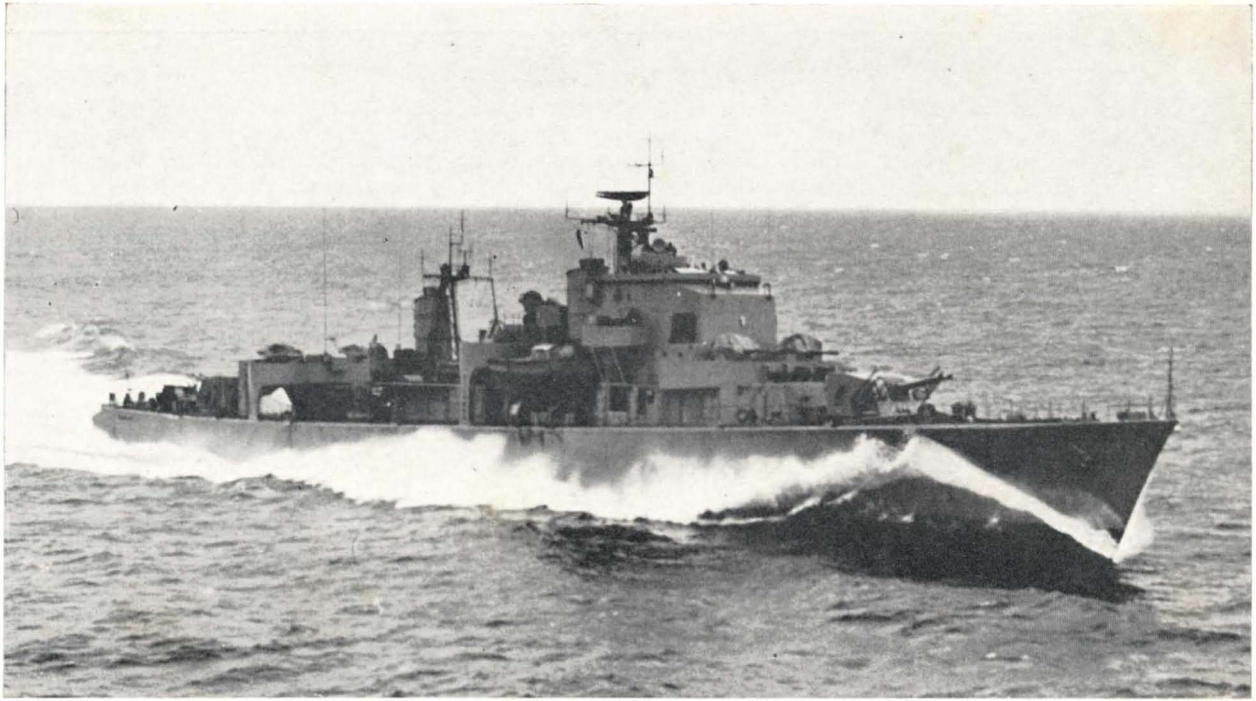
Standard displacement	*Full load displacement*	*Length*	*Beam*	*Draught*
Halland, Smaland, 2,650 tons	3,200 tons	397¼ feet	41 feet	14¾ feet
Other four 2,150 tons	2,600 tons	380 feet	36¾ feet	12 feet

Main guns	*Anti-aircraft guns*	*Torpedo tubes*	*Anti-submarine weapons*
4–4.7 inch	2–57 mm., 6–40 mm.	8–21 inch	2–4 barrelled depth charge mortars
4–4.7 inch	7–40 mm.	6–21 inch	2–4 barrelled depth charge mortars

Propelling machinery	*Shaft horse power*	*Boilers*	*Speed*	*Complement*
Geared steam turbines	58,000	3	35 knots	290
Geared steam turbines	40,000	2	35 knots	244

Name	*Begun*	*Launched*	*Completed*	*Builders*
HALLAND	1951	16 July 1952	1 Feb. 1955	Gotaverken, Goteborg
SMALAND	1951	23 Oct. 1952	12 Jan. 1956	Eriksberg Mekaniska Verkstad
GASTRIKLAND	Oct. 1955	6 June 1956	Aug. 1958	Gotaverken, Goteborg
HALSINGLAND	Oct. 1955	14 Jan. 1957	Dec. 1958	Kockums Mekaniska Verkstads
ÖSTERGÖTLAND	Sep. 1955	8 May 1956	Oct. 1957	Gotaverken, Goteborg
SODERMANLAND	1 June 1955	28 May 1956	21 Mar. 1958	Eriksberg Mekaniska Verkstad

Note: There are also *Oland* and *Uppland*, 1,990 tons completed in 1947–48; and *Halsingborg*, *Kalmar*, *Sundsvall* and *Visby*, 1,150 tons completed in 1943 (see full particulars and photographs on pages 174 to 177 of the 1960 Edition). The old destroyers *Gavle*, *Karlsprona*, *Malmo*, *Norrkoping* and *Stockholm*, 1,250 tons completed in 1937–41, were re-rated as frigates in 1961.



ÖSTERGÖTLAND

BAYERN **HAMBURG** **HESSEN** **SCHLESVIG-HOLSTEIN**

These are the first destroyers built for the *Bundesmarine* or Federal German Navy and, apart from the training ship *Deutschland*, are the biggest warships built in West Germany since the Second World War. Named after the countries of the Federal German Republic, they have a powerful yet handsome appearance, and are very comprehensively armed and equipped, with a good turn of speed. Eight much larger destroyers to be armed with guided missiles are projected.

(The Federal German Navy also has six former United States destroyers, namely *Z* 1 (ex-U.S.S. *Anthony*), *Z* 2 (ex-U.S.S. *Ringgold*), *Z* 3 (ex-U.S.S. *Wadsworth*), *Z* 4 (ex-U.S.S. *Claxton*), *Z* 5 (ex-U.S.S. *Dyson*) and *Z* 6 (ex-U.S.S. *Charles Ausburn*), all of the "Fletcher" class and lent in 1958–60).

Standard displacement	*Full load displacement*	*Length*	*Beam*	*Draught*
2,850 tons	3,800 tons	423¾ feet	42⅔ feet	15¾ feet

Main guns	*Anti-aircraft guns*	*Anti-submarine weapons*	*Torpedo tubes*
4–3.9 inch (100 mm.) dual purpose (single)	8–40 mm. (4 twin)	2 four-barrelled depth charge mortars (Bofors rocket launchers)	5–21 inch 2 for ASW

Propelling machinery	*Shaft horse power*	*Boilers*	*Speed*	*Complement*
Geared steam turbines	70,000	4	36 knots	350

Name	*Begun*	*Launched*	*Completed*	*Builders*
BAYERN	1961	14 Aug. 1962		H. C. Stulcker Sohn, Hamburg
HAMBURG	1959	26 Mar. 1960	1963	H. C. Stulcken Sohn, Hamburg
HESSEN	1962	4 May 1963		H. C. Stulcken Sohn, Hamburg
SCHLESWIG-HOLSTEIN	1959	20 Aug. 1960	1963	H. C. Stulcken Sohn, Hamburg

Note: The training ship *Deutschland* was the first West German naval ship to exceed the post-war limit of 3,000 tons displacement. Of the large destroyer/frigate/small cruiser type, she has a displacement of 4,250 tons standard and 5,500 tons full load with a length of 475¾ feet, beam of 59 feet and draught of 14¼ feet. Guns: 4–3.9 inch, 6–40 mm. Tubes: 4. A/S weapons: 2 4-barrelled depth charge mortars. Aircraft: 1 helicopter. Machinery: 2 Mercedes-Benz and 2 Maybach diesels, B.H.P. 6,680 and Geared steam turbines, S.H.P. 8,000. 3 shafts. Speed + 22 kts. Complement 528. Begun 1959. Launched 5 Nov. 1960. Completed 1963.

DEUTSCHLAND

L

AKIZUKI	**HARUSAME**	**AYANAMI**	**SHIKINAMI**	**HARUKAZE**
TERUZUKI	**MURASAME**	**ISONAMI**	**TAKANAMI**	**YUKIKAZE**
	YUDACHI	**MAKINAMI**	**URANAMI**	
		ONAMI		

The two ships of the "Zuki" or "Moon" class are destroyers of a new design with a long forecastle hull received from the U.S.A. as part of the Military Aid Programme, but built in Japanese shipyards under an "off-shore" procurement agreement. They were designed as flotilla leaders to serve as senior officers' ships, and *Akizuki* became the flagship of the "Maritime Self-Defence Force", as Japan's post-war navy is still known.

The two vessels of the "Same" or "Rain" class were designed as anti-aircraft destroyers. Although of typically Japanese appearance there is a suggestion of American influence in their layout.

The seven destroyers of the "Nami" or "Wave" class were designed as anti-submarine escorts. The "Hedgehog" throwers are mounted on turntables before the bridge; four torpedo loading racks are mounted in pairs abreast the after funnel; and droppers for anti-submarine homing torpedoes are mounted on the quarter deck.

The two vessels of the "Kaze" or "Wind" class were the first destroyer-hulled ships built in Japan after the Second World War. In their novel construction electric welding was used, with high tension steel in the hull and light alloy in the superstructure.

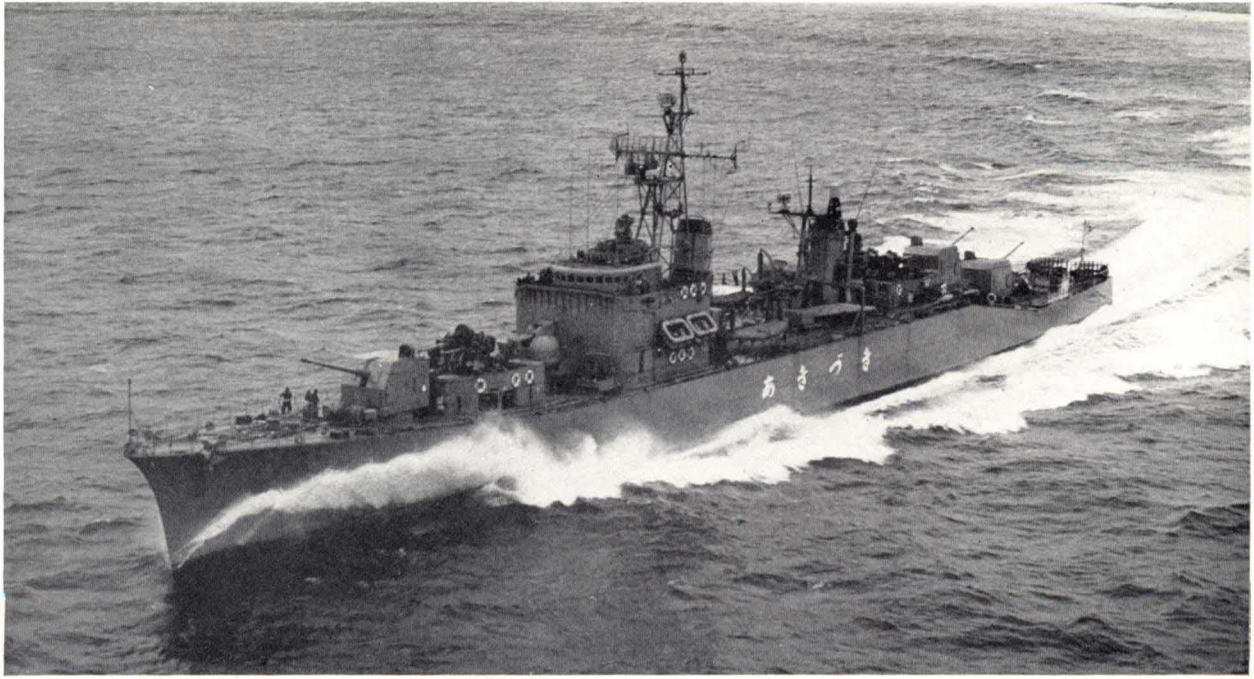
Japan also has four ex-U.S. destroyers, the *Ariake* and *Yugure* of the later "Fletcher" class, and the *Asakaze* and *Hatakaze* of the "Gleaves" class.

Four guided missile armed destroyers of 3,000 tons are being built in Japanese yards.

Standard displacement	*Full load displacement*	*Length*	*Beam*	*Draught*
"Zuki" class: 2,350 tons	2,890 tons	387¼ feet	39⅓ feet	13½ feet
"Same" class: 1,800 tons	2,500 tons	360 feet	36 feet	12¼ feet
"Nami" class: 1,700 tons	2,500 tons	357¾ feet	35½ feet	11⅞ feet
"Kaze" class: 1,700 tons	2,340 tons	358½ feet	34½ feet	12 feet

Main and anti-aircraft guns	*Torpedo tubes, launchers*	*Anti-submarine weapons*
3–5 inch d.p.; 4–3 inch AA.	4–21 inch (quad), 2 homing	2 hedgehogs, 2 Y-guns, 1 rocket launcher
3–5 inch d.p.; 4–3 inch AA.	8 short anti-submarine	1 hedgehog, 2 Y-guns, 1 d.c. rack
6–3 inch AA. (3 twin)	4–21 inch (quad), 2 homing	2 hedgehogs, 2 Y-guns
3–5 inch d.p.; 8–40 mm. AA.	Tubes for short homing	2 hedgehogs, 4 K-guns, 1 d.c. rack

Propelling machinery	*Shaft horse power*	*Boilers*	*Speed*	*Complement*
Geared steam turbines	45,000	2 high pressure	32 knots	330
Geared steam turbines	30,000	2 high pressure	30 knots	240
Geared steam turbines	35,000	2 high pressure	32 knots	230
Geared steam turbines	30,000	2 high pressure	30 knots	190



AKIZUKI

ALP ARSLAN KILIÇ ALI PASA MARESAL FEVZI CAKMAK PIYALE PAŞA

These four ships were formerly the British destroyers *Marne*, *Matchless*, *Meteor* and *Milne*, survivors of a class of eight, one of the most successful and handsome types which ever served in the Royal Navy. They were the first British destroyers to have three power-worked turrets. *Milne* was fitted as the flotilla leader. All four ships were transferred from Great Britain to Turkey under an agreement signed in Ankara on 16th August 1957 and were delivered to Turkey after refit in Great Britain in 1958–59, when the after bank of four 21-inch torpedo tubes and the secondary armament of one 4-inch gun and ten 20-mm. anti-aircraft guns were removed and replaced by a deckhouse, a triple-barrelled "Squid" depth charge mortar and six 40-mm. Bofors anti-aircraft guns; and they were renamed after famous generals and 16–18th century admirals.

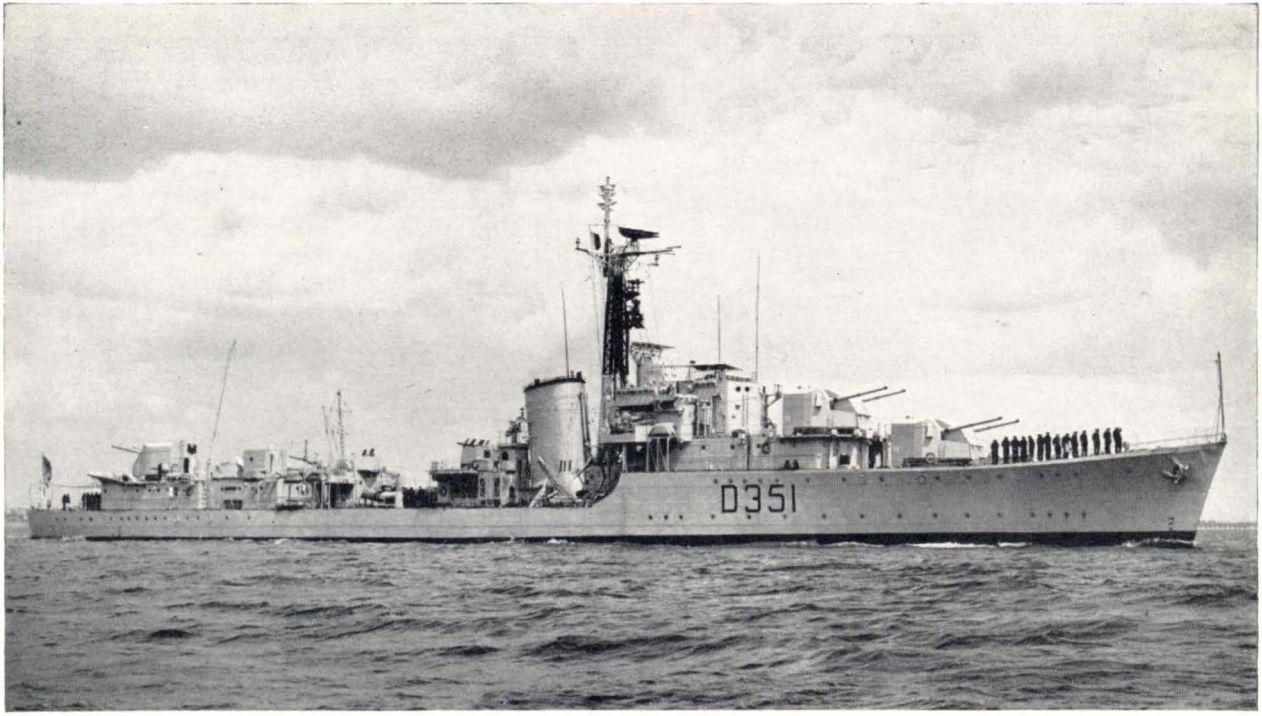
Standard displacement	*Full load displacement*	*Length*	*Beam*	*Draught*
2,000 to 2,015 tons	2,840 tons	362½ feet	36¾ feet	16¼ feet

Main guns	*Anti-aircraft guns*	*Torpedo tubes*	*Anti-submarine weapons*
6–4.7 inch	6–40 mm.	4–21 inch	1 "Squid" triple-barrelled depth charge mortar

Propelling machinery	*Shaft horse power*	*Boilers*	*Speed*	*Complement*
Geared steam turbines	48,000	2 Admiralty 3-drum type	36 knots	240

Name	*Begun*	*Launched*	*Completed*	*Builders*
MARESAL FEVZI CAKMAK	23 Oct. 1939	30 Oct. 1940	2 Dec. 1941	Vickers-Armstrongs, Ltd., Tyne
KILIÇ ALI PASA	14 Sep. 1940	4 Sep. 1941	26 Feb. 1942	Alex. Stephen & Sons, Ltd., Govan
PIYALE PAŞA	14 Sep. 1940	3 Nov. 1941	12 Aug. 1942	Alex. Stephen & Sons, Ltd., Govan
ALP ARSLAN	24 Jan. 1940	30 Dec. 1941	6 Aug. 1942	Scotts' S.B. & Eng. Co., Ltd., Greenock

Note: Turkey also has four ex-U.S. destroyers, *Gaziantep*, *Gelibolu*, *Gemlik* and *Giresun*. Of the four British-built destroyers, *Gayret* has been reclassified as an auxiliary, and *Demirhisar*, *Muavenet* and *Sultanhisar* were discarded in 1960.



KILIÇ ALI PASA

ATHABASKAN **HAIDA** **IROQUOIS** **NOOTKA**
CAYUGA **HURON** **MICMAC**

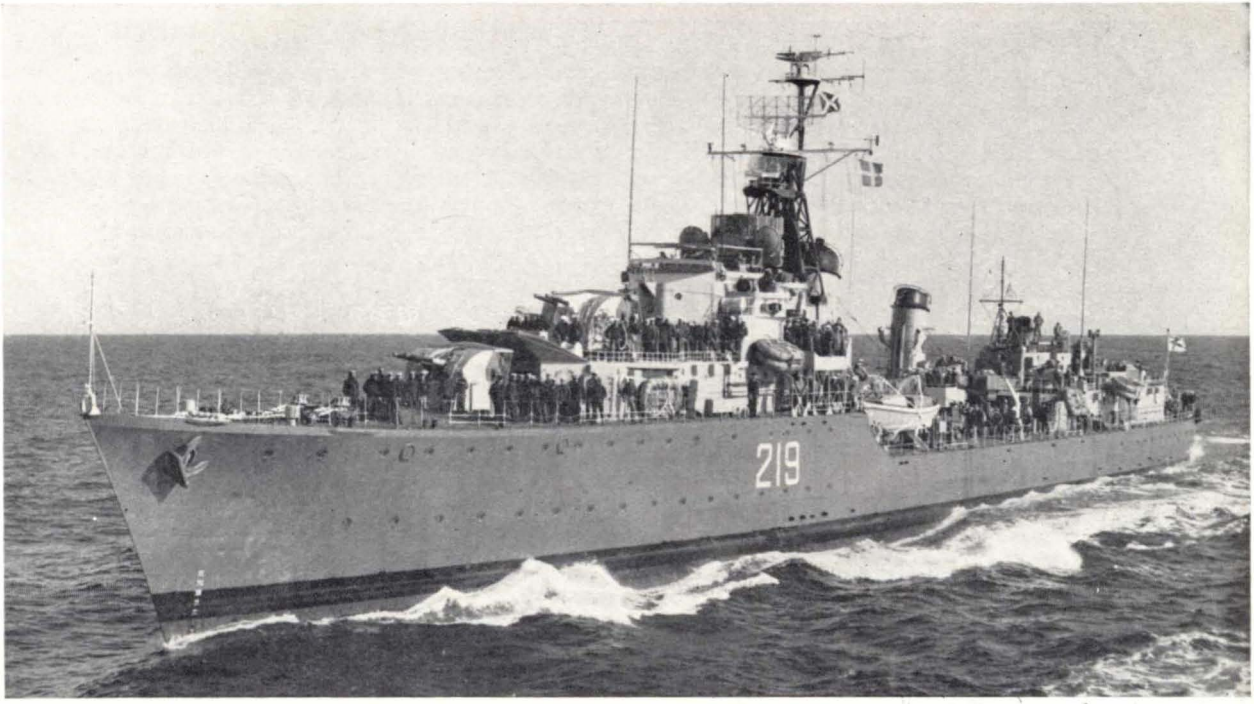
These ships fall into two groups, *Haida*, *Huron*, *Iroquois* (and war-loss *Athabaskan*) having been built in British shipyards, while the remaining four (including a new *Athabaskan*) are Canadian built. Originally these ships were identical with the now scrapped British "Tribal" class, one representative of which, *Arunta* (*Warramunga* and *Bataan* have been scrapped), still exists in the Royal Australian Navy. Since completion, however, all ships have undergone various alterations and modernisation. The design has now been standardised and all ships are alike. They have been rearmed to be more effective anti-submarine units, and they uniformly have a new short aluminium lattice foremast and funnel caps.

Standard displacement	*Full load displacement*	*Length*	*Beam*	*Draught*
2,200 tons	2,800 tons	377 (*o.a.*) feet	37½ feet	9½ (15 aft) feet

Main guns	*Anti-aircraft guns*	*Torpedo tubes*	*Anti-submarine weapons*	*Complement*
4–4 inch	2–3 inch (U.S. model) 4–40 mm.	4–21 inch	2 "Squid" triple-barrelled depth charge mortars	240

Propelling machinery	*Shaft horse power*	*Boilers*	*Speed*
Geared steam turbines	44,000	3 Admiralty 3-drum type	36.5 knots

Name	*Begun*	*Launched*	*Completed*	*Builders*
ATHABASKAN	15 May 1943	4 May 1946	20 Feb. 1948	Halifax Shipyards, Ltd., Halifax, Nova Scotia
CAYUGA	7 Oct. 1943	28 July 1945	20 Oct. 1947	Halifax Shipyards, Ltd., Halifax, Nova Scotia
HAIDA	29 Sep. 1941	25 Aug. 1942	18 Sep. 1943	Vickers-Armstrongs, Ltd., Newcastle-on-Tyne
HURON	15 July 1941	25 June 1942	28 July 1943	Vickers-Armstrongs, Ltd., Newcastle-on-Tyne
IROQUOIS	19 Sep. 1940	23 Sep. 1941	10 Dec. 1942	Vickers-Armstrongs, Ltd., Newcastle-on-Tyne
MICMAC	20 May 1941	18 Sep. 1943	14 Sep. 1945	Halifax Shipyards, Ltd., Halifax, Nova Scotia
NOOTKA	20 May 1941	26 Apr. 1944	8 Aug. 1946	Halifax Shipyards, Ltd., Halifax, Nova Scotia



ATHABASKAN

RIVEROS **WILLIAMS**

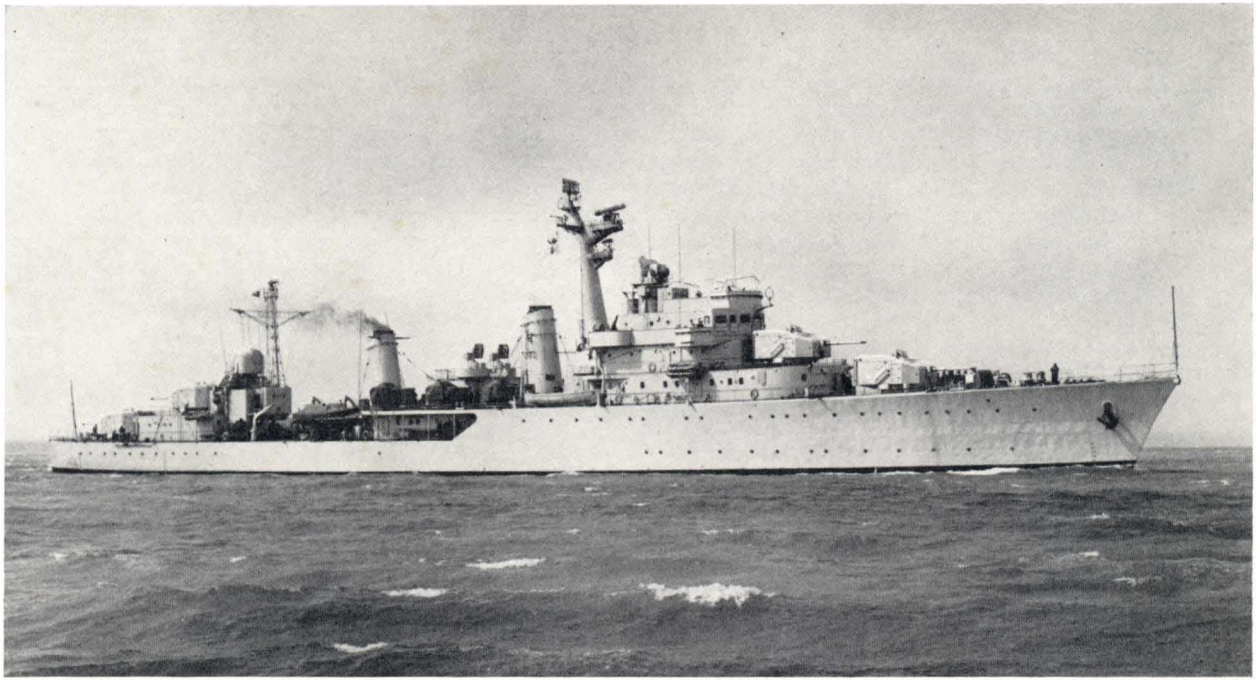
The layout and general arrangements in these two destroyers, named after Almirante Riveros and Almirante Williams, are strictly conventional with two funnels, but an unusual feature is the tapering tubular foremast. Although otherwise identical the sister ships can be identified one from the other: *Williams* has a short pole mainmast, while *Riveros* has a rather taller lattice mainmast instead. The main armament is disposed in four single turrets or gunhouses, two forward and two aft, "B" and "X" guns superfiring over "A" and "Y" positions; they are entirely automatic with a range of 12,500 yards (or over seven miles) and an elevation of 75 degrees. Each ship also carries an anti-aircraft battery of six single 40-mm. guns, disposed three on each beam on an extension of the forecastle deck between the funnels. The torpedo tubes are in a quintuple bank abaft the after funnel; and the two "Squid" type triple depth bomb mortars are sited abreast the mainmast. The conventional power plant comprises Vickers-built Parsons turbines of "Pametrada" design turning two shafts. The operations room and other similar spaces are air-conditioned; and the latest type of warship radar is fitted, specially designed for these ships to work in conjunction with new fire control systems developed by Vickers-Armstrongs. There are twin rudders for exceptional manoeuvrability. The ventilation and heating systems were designed to suit the Chilean coastline, extending from the tropics to Cape Horn; and bunks are fitted for the entire crew. The electrical system is on alternating current; the galleys are all-electric; and there is widespread use of fluorescent lighting. *Riveros* was actually completed within two years since she was launched, but she was not handed over to Chile until 16 Feb. 1962.*

Standard displacement	*Full load displacement*	*Length*	*Beam*	*Draught*
2,730 tons	3,300 tons	402 feet	43 feet	13¾ feet

Main guns	*Anti-aircraft guns*	*Anti-submarine weapons*	*Torpedo tubes*
4–4 inch (single)	6–40 mm. (single)	2 "Squid" type triple-barrelled depth charge mortars	5–21 inch (quintuple)

Propelling machinery	*Shaft horse power*	*Boilers*	*Speed*	*Complement*
Geared steam turbines	54,000	2 Babcock & Wilcox	34.5 knots	266

Name	*Begun*	*Launched*	*Completed*	*Builders*
RIVEROS	12 Apr. 1957	12 Dec. 1958	16 Feb. 1962*	Vickers-Armstrongs Ltd., Barrow
WILLIAMS	20 June 1956	5 May 1958	26 Mar. 1960	Vickers-Armstrongs Ltd., Barrow



ALMIRANTE RIVEROS

ARAGUA **NUEVA ESPARTA** **ZULIA**

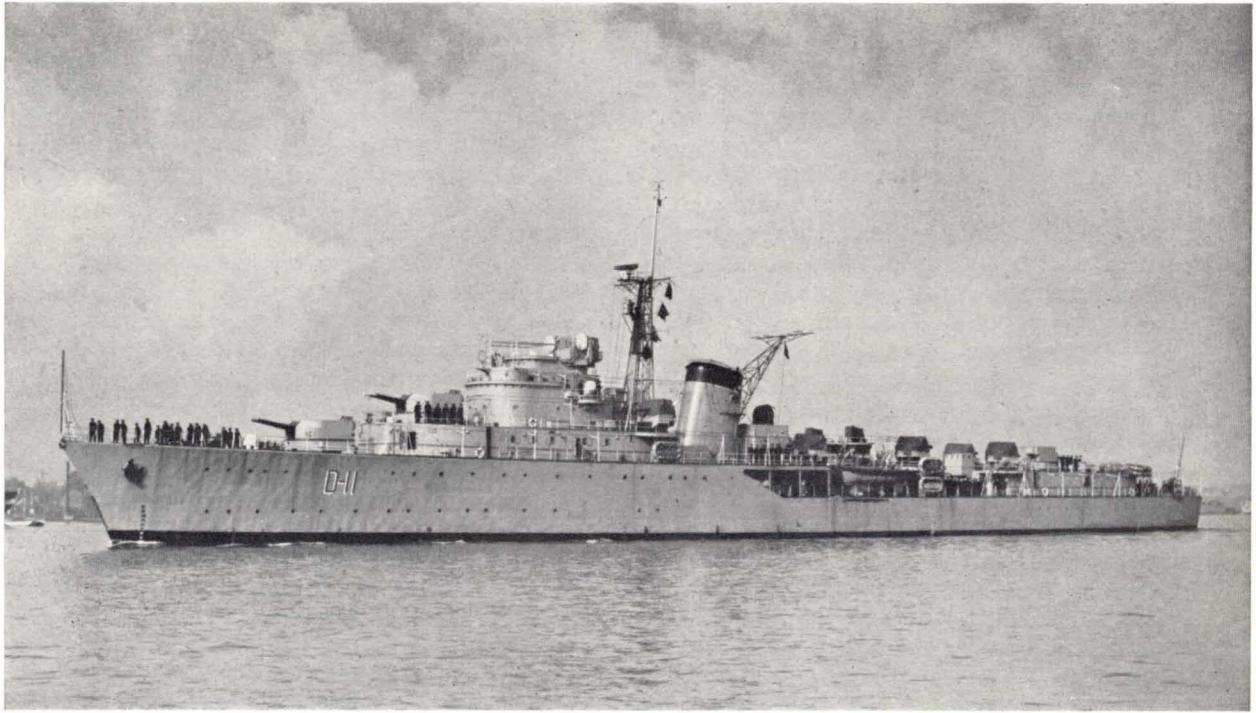
Among the most modern destroyers in the South American navies, these vessels were constructed by Vickers-Armstrongs at Barrow-in-Furness. They are recognitionally very similar to the British and Australian ships of the "Battle" type. In fact, the design would appear to be a combination of a "Daring" armament and layout on a "Battle" hull and appearance. Of considerable size, they do not carry the complicated electronic equipment to be found in the larger navies and there is considerable space below decks that should make for most comfortable and habitable quarters. *Aragua* was completed some time after the other two vessels had joined the Venezuelan Fleet. They are air-conditioned throughout, with a comprehensive electrical system. *Nueva Esparta* and *Zulia* underwent a major refit at Vickers-Armstrongs (Shipbuilders) Limited, Palmers Hebburn Works for seven months in 1959, and " Squid " anti-submarine weapons were mounted.

Standard displacement	*Full load displacement*	*Length*	*Beam*	*Draught*
2,600 tons	3,300 tons	402 feet	43 feet	12¾ feet

Main guns	*Anti-aircraft guns*	*Torpedo tubes*	*Anti-submarine weapons*
6–4.5 inch	16–40 mm.	3–21 inch	"Squids", 2 depth charge throwers, 2 depth charge tracks

Propelling machinery	*Shaft horse power*	*Boilers*	*Speed*	*Complement*
Geared steam turbines	50,000	2	34.5 knots	254

Name	*Begun*	*Launched*	*Completed*	*Builders*
ARAGUA	29 June 1953	27 Jan. 1955	14 Feb. 1956	Vickers-Armstrongs, Barrow-in-Furness
NUEVA ESPARTA	24 July 1951	19 Nov. 1952	8 Dec. 1953	Vickers-Armstrongs, Barrow-in-Furness
ZULIA	24 July 1951	29 June 1953	15 Sep. 1954	Vickers-Armstrongs, Barrow-in-Furness



NUEVA ESPARTA

FRIGATES

THE appellation "frigate" was early adopted by the French for a particular type of fighting ship, and soon became the accepted term for the smaller, faster and more lightly armed vessel carrying her armament on one deck and intended to act as observer for the line-of-battle ship, but not to occupy a place in the line. In Britain, frigate was the name attached to light and speedy one-decked ships, a smaller type of vessel being known as a sloop which had its approximate equivalent in the French corvette. Frigates became a standard class of warship ranking next to ships of the line. They were used to obtain information as to the operations of enemy fleets, and to direct the movements of their own, but it was unusual for them to join in the line of battle, their clashes ordinarily occurring in actions with single ships of their own class. Nelson always complained bitterly of the lack of frigates (as admirals in both the Great Wars did) which by his time were as useful and formidable scouts as were our fast reconnaissance warships of modern times. With the introduction of steam and the growth of the British Navy, frigates were developed more than any other class of warship, many of the largest vessels in the fleet belonging to this wide-embracing class. The famous *Warrior*, Britain's first iron-clad, displacing 9,000 tons, was originally rated as a frigate. "Frigate" continued to be used for this type of ship up to 1887 when the old *Raleigh* of 5,200 tons and other ships were still rated as frigates, but after that all the former frigates were rated as cruisers. Thereafter the term "frigate" lapsed for over 55 years. On 3 March 1943 it was officially announced that the name "frigate" was to be revived for a new class of warship. Of an enlarged corvette type and bearing a family likeness to the pre-war sloop, but built more on the lines of the escort destroyer, our first modern frigates, of the numerous "River" class, were described at the time by naval officers as the finest naval weapon yet invented against the U-boat. In essence they were still one-decked ships like the frigates of old. Numbering, with those built for the Royal Canadian Navy, some 120 units, they displaced 1,460 tons, heavier than our pre-war destroyers, and carried two 4-inch guns, ten 20-mm. A.A. guns and a hedgehog at a speed

of 20 knots. They were followed by a group of nearly 80 frigates of a new type known as the "Captains" class, built in American yards and in most respects similar to the United States destroyer escort types of 1,400 tons with three 3-inch guns and a speed of 24 knots (turbo-electric), or 1,150 tons with a speed of 20 knots (diesel-electric) and 21 American-built frigates of the "Colony" class similar to the original "River" class but of 1,318 tons with 3-inch guns and a speed of 18 knots (reciprocating). The British frigate category thenceforward was a very broad one embracing not only the frigates proper of the "Loch" and "Bay" classes but the former sloops of the "Black Swan" classes with six 4-inch guns, the former escort destroyers of the "Hunt" group with displacements up to 1,175 tons and speeds up to 30 knots, the former corvettes of the "Castle" class of 1,100 tons with a speed of $16\frac{1}{2}$ knots (term "corvette" had been revived on 4 July 1940 after a lapse of 53 years), and former destroyers of 1,730 tons with speeds of $36\frac{3}{4}$ knots. No fewer than 75 British frigates or vessels which would now be classified as frigates were lost during the 1939–45 war. Since 1955 Britain has built or is building 55 new frigates comprising 15 of highly specialised anti-submarine type ("Whitby" and "Rothesay" classes), twelve of utility anti-submarine type ("Blackwood" class), four of anti-aircraft type ("Leopard" class), four of aircraft direction type ("Salisbury" class), seven of general purpose type ("Ashanti" class) and 13 of general purpose and anti-submarine type ("Leander" class). As a type the modern frigate has come to stay. Evolved because the corvette could not do quite all that was required of it, the frigate has developed into a utility destroyer, in fact an ideal escort vessel, submarine killer, anti-aircraft ship, radar picket or aircraft direction ship and maid-of-all-work. In 1963 there are 74 frigates in the British Navy. Their counterparts in the U.S. Navy were formerly the destroyer escorts, but in 1955 the big U.S. destroyer leaders including *Norfolk* (former light cruiser) with speeds of 35 knots, were reclassified as frigates. The new nuclear powered guided missile "frigate" *Bainbridge* displaces 6,500 tons. The wheel has thus turned full cycle with frigates as heavy as those of 76 years ago.

AJAX **CLEOPATRA** **EURYALUS** **LEANDER** **NAIAD** **PHOEBE**
ARETHUSA **DIDO** **GALATEA** **MINERVA** **PENELOPE** **SIRIUS**
AURORA

H.M.S. *Leander*, the first of a new class completed in 1963, was the prototype of a more versatile group of fast anti-submarine frigates which differ from previous vessels of the type in that they are flush to the stern without the break to the quarter deck. The design of the "Leander" class was developed from that of the highly successful "Rothesay" and "Whitby" classes of frigates known as "Type 12", which are noted for their manoeuvrability, performance at high speed, and seakeeping qualities. The same hull form which was largely responsible for these qualities was used in the "Leander" class, and geared steam turbine machinery of high power gives them the speed necessary for their varied tasks. The main armament consists of two dual purpose guns in a twin mounting directed by a fully automatic radar-controlled fire control and gun direction system. The secondary armament of two Bofors anti-aircraft guns in single close range mountings will eventually be replaced by "Seacat" ship-to-air guided missile launchers and directors. All the ships also carry a "Limbo" three-barrelled anti-submarine mortar, and are fitted with the latest equipment for detecting and attacking submarines. The dipping asdic equipment, or variable depth sonar, as it has latterly been known, will greatly enhance their submarine hunting capabilities. The ships are also equipped to carry and operate a helicopter for anti-submarine use (armed with homing torpedoes). Thus, although stemming from the preceding classes of anti-submarine frigates, it will be seen that the "Leander" class have developed into all-round general purpose frigates. They have an improved bridge structure giving greater all-round visibility, especially astern, than was possible in previous ships with enclosed bridges. In the operations room information is handled and presented using semi-automatic techniques. A high standard of accommodation is provided for the ship's company. This includes bunk sleeping, separate dining halls and cafeteria messing. Modern electric galleys are installed and the ships are air conditioned throughout the operational spaces and mess decks.

Standard displacement	*Full load displacement*	*Length*	*Beam*	*Draught*
2,200 tons	2,700 tons	372 feet	41 feet	13¼ feet
Main guns	*Anti-aircraft weapons*	*Anti-submarine weapons*	*Aircraft*	*Complement*
2–4.5 inch (twin)	2–40 mm. guns (to be replaced by "Seacat")	"Limbo" three-barrelled depth charge mortar	1 Wasp helicopter	262
Propelling machinery	*Shaft horse power*	*Boilers*	*Speed*	*Completed*
Geared steam turbines	30,000	2 Babcock & Wilcox	30 knots	March 1963 onwards

LEANDER

ASHANTI ESKIMO GURKHA MOHAWK NUBIAN TARTAR ZULU

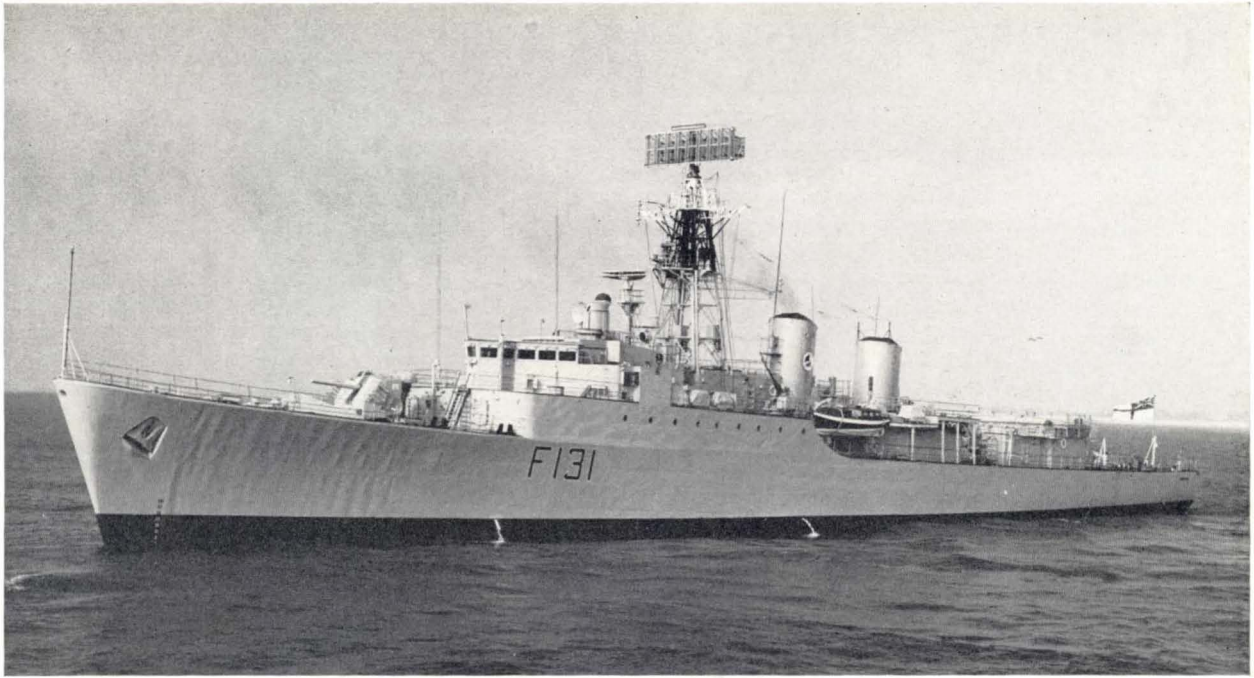
General purpose frigates designed to fulfil economically all the various functions of frigates rather than to have an outstanding performance in any one specialised role, but capable of meeting the main escort requirements of anti-submarine protection, anti-aircraft defence, and aircraft direction. Known as the "Tribal" class, and officially listed as "Type 81", with their two funnels, general design and layout, and rakish appearance they are reminiscent of the destroyer type which they largely supersede as maids-of-all-work. Although conventional in armament they are revolutionary in engine power. They have a COSAG plant, that is a combined steam and gas turbine propulsion installation, which consists of a main boiler and a single cylinder steam turbine with an output of 12,500 s.h.p. combined with a gas turbine of 7,500 s.h.p., both prime movers being located side by side in a combined machinery space forward of the gearing. The design and layout of compartments make it possible for each ship to be steamed through a nuclear fall-out with the ship's company enclosed in an air-conditioned citadel, with the main propulsion machinery remotely controlled from a compartment in the centre of the ship.

Standard displacement	*Full load displacement*	*Length*	*Beam*	*Draught*
2,300 tons	2,700 tons	360 feet	42½ feet	13¼ feet

Main guns	*Anti-aircraft guns*	*Anti-submarine weapons*	*Aircraft*
2–4.5 inch dual purpose (single mountings)	2–40 mm. Bofors (single mountings)	1 "Limbo" three-barrelled depth charge mortar	Wasp helicopter

Propelling machinery	*Shaft horse power*	*Boilers*	*Speed*	*Complement*
1 Metrovik geared steam turbine plus 1 Metrovik G.6 gas turbine	20,000	1 Babcock & Wilcox plus 1 auxiliary	28 knots	265

Name	*Begun*	*Launched*	*Completed*	*Builders*
ASHANTI	15 Jan. 1958	9 Mar. 1959	23 Nov. 1961	Yarrow & Co. Ltd., Scotstoun, Glasgow
ESKIMO	22 Oct. 1958	20 Mar. 1961	21 Feb. 1963	J. Samuel White & Co. Ltd., Cowes, I. of W.
GURKHA	3 Nov. 1958	11 July 1960	13 Feb. 1963	John I. Thornycroft & Co. Ltd., Southampton
MOHAWK	23 Dec. 1960	5 Apr. 1962		Vickers-Armstrongs Ltd., Barrow-in-Furness
NUBIAN	7 Sep. 1959	6 Sep. 1960	9 Oct. 1962	H.M. Dockyard, Portsmouth
TARTAR	22 Oct. 1959	19 Sep. 1960	26 Feb. 1963	H.M. Dockyard, Devonport
ZULU	13 Dec. 1960	3 July 1962		Alex. Stephen & Sons Ltd., Govan, Glasgow



NUBIAN

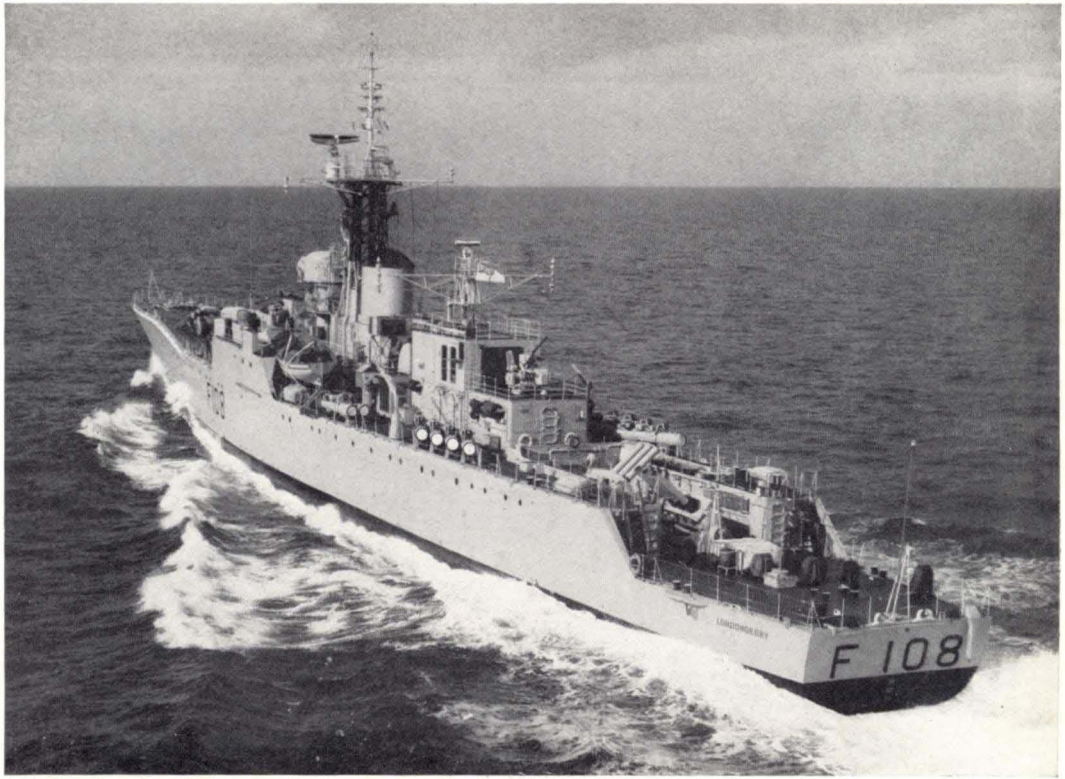
M

BERWICK	**EASTBOURNE**	**LOWESTOFT**	**ROTHESAY**	**TORQUAY**
BLACKPOOL	**FALMOUTH**	**PLYMOUTH**	**SCARBOROUGH**	**WHITBY**
BRIGHTON	**LONDONDERRY**	**RHYL**	**TENBY**	**YARMOUTH**

These 1st Rate frigates of anti-submarine "quality" type were primarily designed for location and detection of modern submarines, and are fitted with the latest underwater hunting equipment and submarine-killing weapons of post-war development. Good sea-keeping qualities enable them to maintain their high speed in rough seas. All named after seaside resorts, and officially listed as "Type 12", this group was officially considered to be the most useful class in the broad frigate and escort category ever put into service with the Fleet. The ships are remarkable in heavy weather. With their high forecastle and clean lines they ride well in a sea-way, and are exceptionally dry. The excellent enclosed bridge is spacious, with splendid vision and the heated windows in the fore part are an asset in Arctic waters. Internal communications within the departments have satisfied every demand placed upon them, and the siting of voice-pipes, call-ups and intercoms has proved to be most convenient. The operations room was the finest ever put into comparatively small warships. The vessels are all welded, and they were specially designed to achieve the lightest possible structure. Opportunity was taken in their building to gain experience of welding procedures and arrangements calculated to conduce to rapid construction of such vessels in emergency. The earlier units, *Blackpool*, *Eastbourne*, *Scarborough*, *Tenby*, *Torquay* and *Whitby*, constitute the "Whitby" class and the others the "Rothesay" class, the design of which was modified. The twelve 21-inch torpedo tubes were suppressed.

Standard displacement	*Full load displacement*	*Length*	*Beam*	*Draught*
2,150 tons	2,560 tons	370 feet	41 feet	12¾ feet
Main guns	*Anti-aircraft armament*		*Anti-submarine weapons*	*Complement*
2–4.5 inch	2–40 mm. (1–40 mm. in "Rothesay" class, to be replaced by "Seacat")		2 "Limbo" 3-barrelled depth charge mortars	152 to 200
Propelling machinery	*Shaft horse power*	*Boilers*	*Speed*	*Completed*
Geared steam turbines	30,430	2 Babcock & Wilcox	31 knots	May 1956 to Oct. 1961

LONDONDERRY



JAGUAR **LEOPARD** **LYNX** **PUMA**

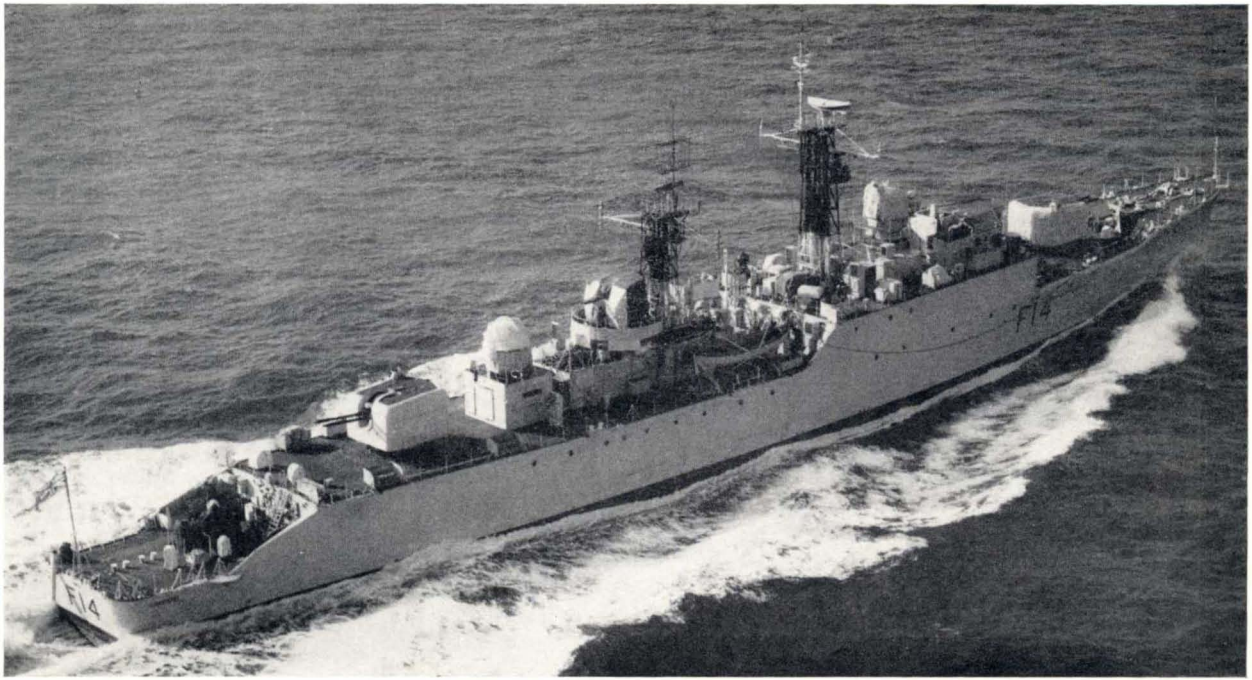
Known as the "Leopard" class, these 1st Rate frigates of the diesel-powered anti-aircraft type were designed primarily for the protection of convoys against air attack, but it was officially stated that they were also intended to serve as a medium type of destroyers for offensive operations. The 4.5-inch twin turrets, mountings and gunnery armament control are similar to those mounted in the large destroyers of the "Daring" class. All named after big cats, they are all welded, and the structural arrangements represent the last word in the development of modern technique, it is officially stated, opportunity having been taken during their construction to study the problems associated with rapid production in emergency conditions. Officially listed as "Type 41", they are fitted with stabilisers. The propelling machinery consists of Admiralty Standard Range I heavy oil engines coupled to the propeller shafting through hydraulic couplings and oil-operated reverse and reduction gear boxes. *Jaguar* is fitted with controllable pitch propellers. The anti-aircraft guns in all ships will eventually be replaced by a "Seacat" surface-to-air guided missile launcher. *Lynx* has been refitted with a main "mack", or combined mast-stack.

Standard displacement	*Full load displacement*	*Length*	*Beam*	*Draught*
2,300 tons	2,520 tons	340 feet	40 feet	12 feet

Main guns	*Anti-aircraft guns*	*Anti-submarine weapons*	*Guided weapons*
4–4.5 inch	2–40 mm.	"Squid" triple-barrelled depth charge mortar	"Seacat" to be fitted in *Jaguar*

Propelling machinery	*Brake horse power*	*Speed*	*Complement*
8 A.S.R.1 diesels	12,380	25 knots	195 to 205

Name	*Begun*	*Launched*	*Completed*	*Builders*
JAGUAR	2 Nov. 1953	30 July 1957	12 Dec. 1959	Wm. Denny & Bros. Ltd., Dumbarton
LEOPARD	25 Mar. 1953	23 May 1955	30 Sep. 1958	H.M. Dockyard, Portsmouth
LYNX	ordered 28 June 1951	12 Jan. 1955	14 Mar. 1957	John Brown & Co. Ltd., Clydebank
PUMA	ordered 28 June 1951	30 June 1954	24 Apr. 1957	Scotts' S.B. & Eng. Co. Ltd., Greenock



LEOPARD

CHICHESTER **LINCOLN** **LLANDAFF** **SALISBURY**

The 1st Rate frigates of this aircraft direction type, known as the "Salisbury" class, were primarily designed for the direction of carrier-borne and shore-based aircraft, and they can be employed as ocean radar pickets. They were also intended to serve as a lighter type of destroyers in offensive operations. Their hull design and dimensions as well as their propelling machinery are the same as those of the "Leopard" class anti-aircraft frigates previously described, but they have only one 4.5-inch twin turret, mounted forward as in the "Whitby" class anti-submarine frigates. *Salisbury* has undergone extended refit, her after funnel inside a lattice mast having been replaced by a combined "mack" or combined mast-stack to support a much larger radar aerial. Officially listed as "Type 61", these ships have very highly developed electronic equipment. Their construction is all welded, and the design was largely prefabricated in such a manner as to allow for rapid building in emergency. *Llandaff* has a gas turbine alternator. All the ships of this class are named after cathedral cities. The ship allocated the name *Coventry* was in fact built as *Penelope* of the "Leander" class.

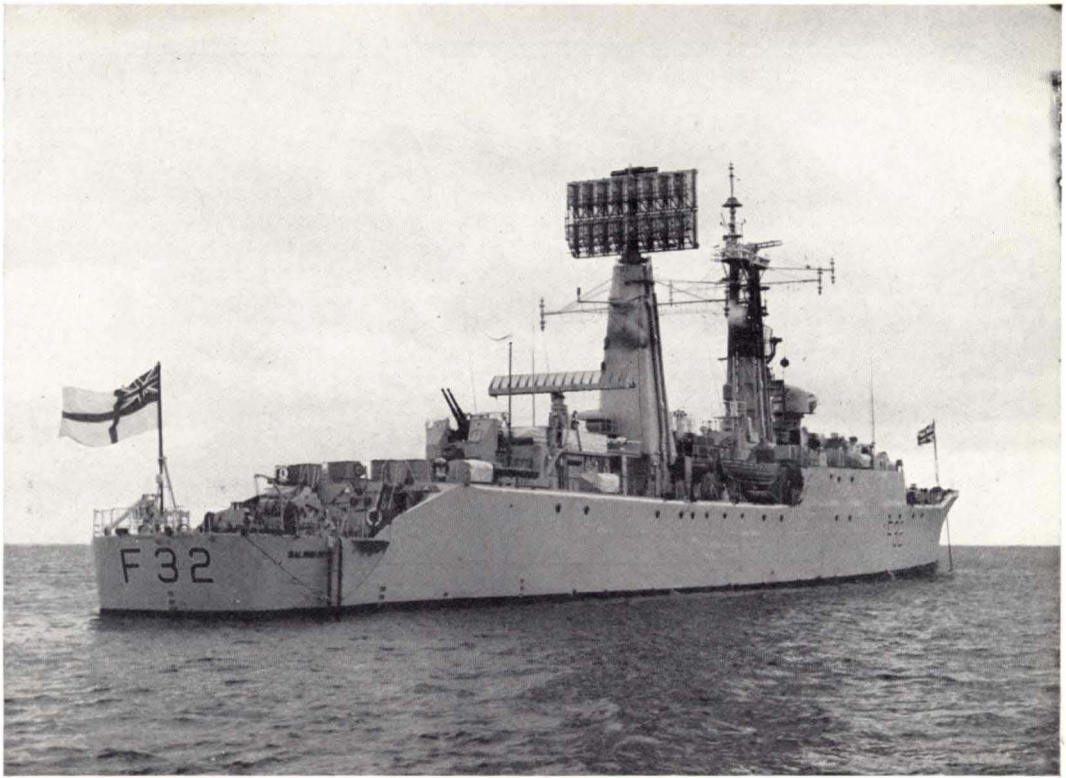
Standard displacement	*Full load displacement*	*Length*	*Beam*	*Draught*
2,170 tons	2,350 tons	340 feet	40 feet	11½ feet

Main guns	*Anti-aircraft guns*	*Anti-submarine weapons*	*Guided weapons*
2–4.5 inch	2–40 mm. (1–40 mm. in *Lincoln*)	"Squid" triple-barrelled depth charge mortar	"Seacat" to be fitted in *Lincoln*

Propelling machinery	*Brake horse power*	*Speed*	*Complement*
8 A.S.R.1 diesels	12,380	25 knots	206 to 210

Name		*Begun*	*Launched*	*Completed*	*Builders*
CHICHESTER	ordered	28 June 1951	21 Apr. 1955	16 May 1957	Fairfield S.B. & Eng. Co. Ltd., Govan, Glasgow
LINCOLN		June 1955	6 Apr. 1959	7 July 1960	Fairfield S.B. & Eng. Co. Ltd., Govan, Glasgow
LLANDAFF	ordered	28 June 1951	30 Nov. 1955	11 Apr. 1958	Hawthorn Leslie Ltd., Hebburn-on-Tyne
SALISBURY		23 Jan. 1952	25 June 1953	27 Feb. 1957	H.M. Dockyard, Devonport

SALISBURY



BLACKWOOD **DUNDAS** **GRAFTON** **KEPPEL** **MURRAY** **PELLEW**
DUNCAN **EXMOUTH** **HARDY** **MALCOLM** **PALLISER** **RUSSELL**

These 2nd Rate frigates of anti-submarine "utility" type, known as the "Blackwood" class, of a novel, very lightly armed type, as far as guns are concerned, were designed mainly for a submarine hunting and killing role. They are of comparatively simple construction. All were designed in prefabricated sections. Their two "Limbo" ahead-projecting anti-submarine multiple mortars can each fire a pattern of large depth bombs with great accuracy, and the projectiles can be set to explode at any predetermined depth. These weapons can be trained over a wider arc than any previous type of anti-submarine mortars and have a much greater and more accurate range. It was officially stated that the turbines were of advanced design. *Russell* has a helicopter platform fitted aft. *Duncan*, fitted as the squadron leader, *Malcolm*, *Palliser* and *Russell* constituted the Royal Navy's Fishery Protection Squadron in 1958. All the ships of this class are named after famous naval captains of the past, and are officially listed as "Type 14". All ships have had their hulls strengthened.

Standard displacement	*Full load displacement*	*Length*	*Beam*	*Draught*
1,180 tons	1,536 tons	310 feet	33 feet	$10\frac{3}{4}$ feet
Anti-aircraft guns	*Torpedo Tubes*	*Anti-submarine weapons*		*Complement*
3–40 mm.	4–21 inch	2 "Limbo" three-barrelled depth charge mortars		111
Propelling machinery	*Shaft horse power*	*Boilers*	*Speed*	*Completed*
Geared steam turbines	15,000	2 Babcock & Wilcox	28 knots	Dec. 1955 to Oct. 1958

Note: Of the five surviving "Bay" class frigates, *Morecambe Bay* and *Mounts Bay* were transferred to Portugal in 1961 and *Porlock Bay* to Finland in 1962, and *Cardigan Bay* and *St. Brides Bay* were scrapped. Of the eleven "Loch" class frigates only *Loch Alvie*, *Loch Fada*, *Loch Killispat* and *Loch Lomond* remained in service in 1963, *Loch Craggie*, *Loch Fyne*, *Loch Inch*, *Loch More*, *Loch Ruthven*, *Loch Tralaig* and *Loch Veyatie* having been stricken or earmarked for disposal (see full particulars in the 1960 Edition).

PELLEW

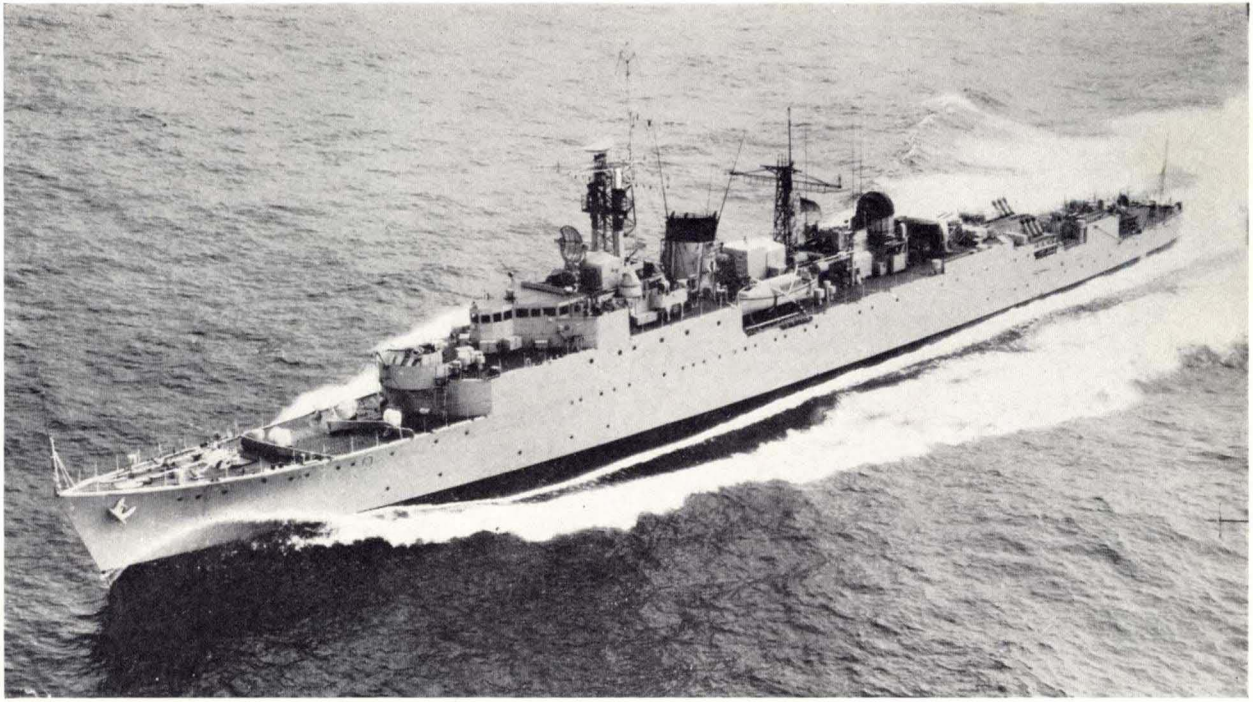
ZEST	**WAKEFUL**	**VENUS**	**GRENVILLE**	**URANIA**	**TROUBRIDGE**	**RAPID**
	WHIRLWIND	**VERULAM**	**ULSTER**	**URCHIN**		**RELENTLESS**
	WIZARD	**VOLAGE**	**UNDAUNTED**	**URSA**		

These vessels, known as the "full conversion" class, and officially listed as "Type 15", represented the post-war British conception of fast anti-submarine frigates. Originally completed in 1942–4 as destroyers of the "Z", "W", "V", "U", "T" and "R" flotillas, in 1949–57 they underwent a complete reconstruction and full conversion involving stripping down to deck level, extending the forecastle right aft, erecting new superstructure and mounting an entirely new armament. There are various differences between them, especially in armament disposition and bridge structure. Australian and Canadian destroyers of the "Q", "V" and "Cr" flotillas were converted in a very similar manner. The Australian ships have the bridge a deck higher and the forward guns before the bridge; the Canadian ships have the forward guns on the forecastle deck level, also they mount 3-inch instead of 40-mm. guns. Most ships mount two "Squid" anti-submarine weapons, but some are fitted with the more recent development, two "Limbos". Tubes, where mounted, are fixed and intended for anti-submarine homing torpedoes, not the conventional type. *Wrangler* of this full conversion type was transferred to the South African Navy in 1956 and renamed *Vrystaat*, *Roebuck*, *Ulysses*, *Undine* and *Vigilant* were scheduled for disposal in 1962, and *Rocket* and *Virago* in 1963.

	Standard displacement	*Full load displacement*	*Length*	*Beam*	*Draught*
"R" class:	2,200 tons	2,700 tons	358½ feet	35⅔ feet	13½ feet
Others:	2,240 tons	2,880 tons	362¾ feet	35⅔ feet	13¾ feet

Main guns	*Anti-aircraft guns*	*Torpedo tubes*	*Anti-submarine weapons*
2–4 inch	2–40 mm.	2 to 8, or none	2 "Squid" or 2 "Limbo" three-barrelled depth charge mortars

Propelling machinery	*Shaft horse power*	*Boilers*	*Speed*	*Complement*
Geared steam turbines	40,000	2 Admiralty 3-drum type	31.25 knots	174 to 195



ZEST

TERPSICHORE **TUMULT** **TUSCAN** **ORWELL** **PETARD**

Known as the "limited conversion" class, and officially listed as "Type 16", these ships are destroyers converted to fast anti-submarine frigates and are complementary to the full conversions previously described. The process of conversion did not involve the complete stripping of the hull, and the ships still retain the appearance of British destroyers. Due to the limited conversion, the anti-aircraft armament is somewhat stronger and part of the original torpedo armament is retained. While more rapidly converted, their anti-submarine effectiveness is probably not so great as that of the full conversions. Originally completed in 1941–3, all completed the conversion in 1952–6. Two more "limited conversions" or "Type 16" fast anti-submarine frigates are the Pakistani vessels *Tippu Sultan* and *Tughril*, formerly the British destroyers *Onslow* and *Onslaught*, respectively, sister ships of the *Orwell* above, which were converted in Great Britain in 1957–9. *Paladin* and *Teazer* were scheduled for disposal in 1962, and *Tenacious*, *Termagant* and *Tyrian* at the end of 1963.

Standard displacement	*Full load displacement*	*Length*	*Beam*	*Draught*
("T" class) 2,000 tons	2,650 tons	362¾ feet	35⅝ feet	13 feet
("O" & "P") 1,825 tons	2,400 tons	345 feet	35 feet	12¼ feet

Main guns	*Anti-aircraft guns*	*Torpedo tubes*	*Anti-submarine weapons*
("T" class) 2–4 inch	7–40 mm.	4–21 inch	2 "Squid" triple-barrelled depth charge mortars
("O" & "P") 2–4 inch	2–40 mm.	4–21 inch	2 "Squid" triple-barrelled depth charge mortars

Propelling machinery	*Shaft horse power*	*Boilers*	*Speed*	*Complement*
Geared steam turbines	40,000	2 Admiralty 3-drum type	31.25 knots	170 to 175

TUMULT

12 "KOLA" CLASS **64 "RIGA" CLASS**

The design of the "Kola" class of flush-decked, two-funnelled destroyer escorts or frigates appears to be a combination of that of the German "Elbing" type torpedo boat destroyers, with a similar hull form, and of the older Russian frigates of the "Birds" class. The four 3.9 inch guns, which are similar to the main armament in the "Birds" class frigates are mounted as in the "Gordi" class destroyers. It is reported that eight units of this class are in the Baltic and four in the Far East, the numbers of the latter being 622, 632, 639 and 652.

The very handsome and rakish-looking escort vessels or frigates of the "Riga" class are of the light destroyer or oceangoing torpedo boat type. They appear to be a lighter and less heavily armed but improved version of the "Kola" class destroyer escorts in design. Numbers reported are 50, 54, 55, 168, 324, 642, 645, 651 and 656. The class is actually sub-divided into two types with different schemes of masting. The earlier group have a tied tripod foremast, while the later units have a substantial lattice foremast to support heavier radar aerials with a stepped back topmast.

Standard displacement	*Full load displacement*	*Length*	*Beam*	*Draught*
("Kola" class) 1,500 tons	2,000 tons	305 feet	32¾ feet	11 feet
("Riga" class) 1,200 tons	1,600 tons	295 feet	31½ feet	11 feet

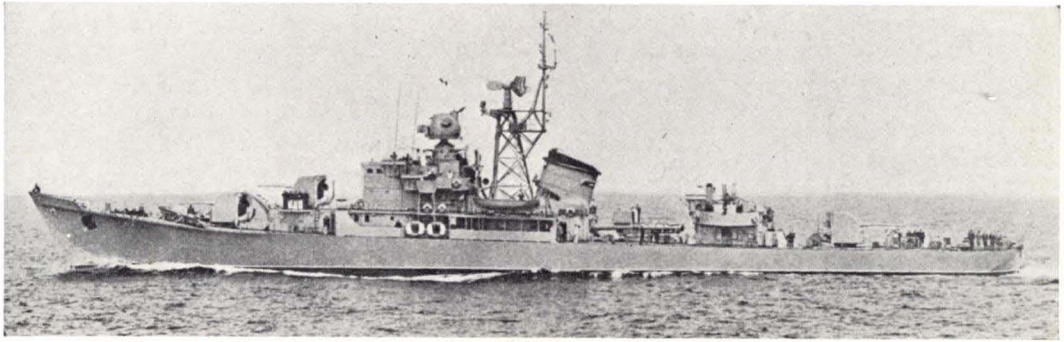
Main guns	*Anti-aircraft guns*	*Torpedo tubes*	*Anti-submarine armament*
("Kola" class) 4–3.9 inch	4–37 mm.	3–21 inch	Depth charge racks
("Riga" class) 3–3.9 inch	3–37 mm.	3–21 inch	4 depth charge projectors

Propelling machinery	*Boilers*	*Shaft horse power*	*Speed*	*Complement*
("Kola" class) Geared steam turbines	2	30,000	31 knots	190
("Riga" class) Geared steam turbines	2	25,000	28 knots	180

Note: Of the older Russian frigates the Improved "Birds" class comprises the *Albatross*, *Chaika* and *Krechet*. The "Birds" class consists of the *Berkut*, *Grif*, *Kondor*, *Korshun*, *Orel*, *Voron* and *Yastreb*.

"KOLA" Class

"RIGA" Class



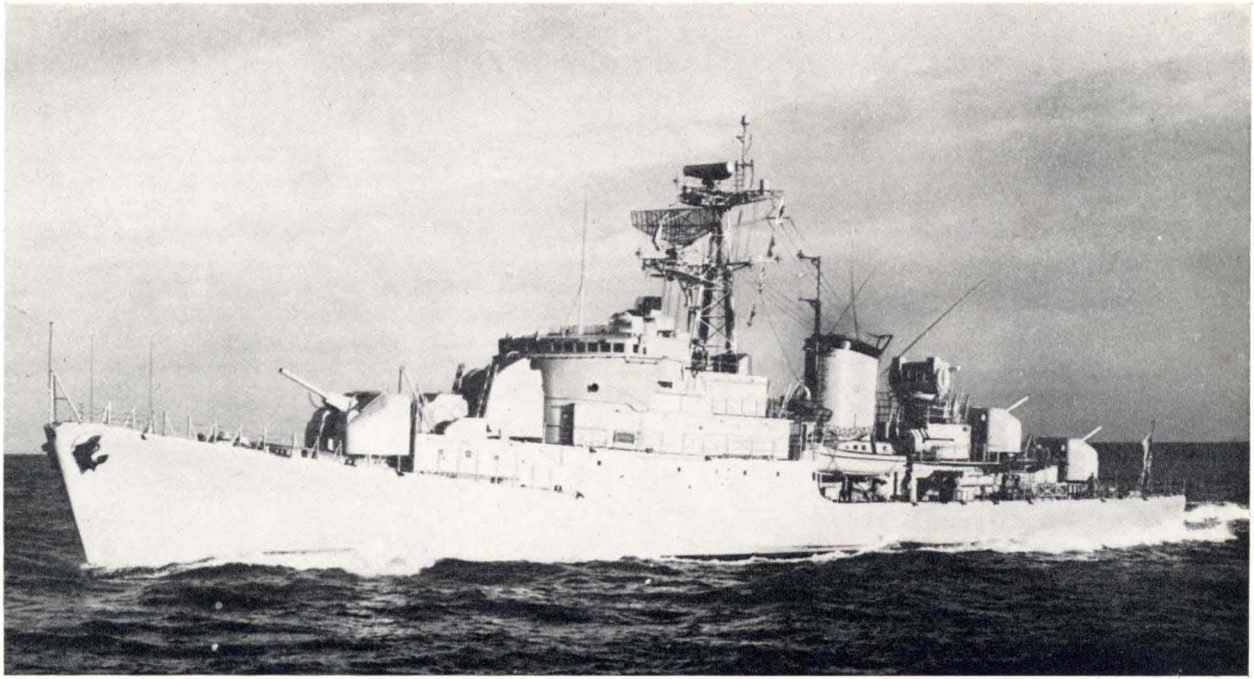
AMIRAL CHARNER
BALNY
COMMANDANT BORY
COMMANDANT BOURDAIS
COMMANDANT RIVIERE
DOUDART DE LA GREE
ENSEIGNE DE VAISSEAU HENRY
PROTET
VICTOR SCHOELCHER

These vessels of the "Commandant Rivière" class are of a new dual purpose type for both actual peacetime and potential wartime duties. Of sturdy and powerful appearance, they were formerly classed as *Escorteurs d'Union Francaise* (French overseas escorts), but they were officially re-rated as *Avisos Escorteurs* (sloop escorts) in 1959, and broadly they take the place of the former colonial sloops recently scrapped. They were, however, designed for multi-purpose roles, to serve as *avisos* or sloops in peacetime and anti-submarine frigates in wartime. Their main armament of three single 100-mm. guns are of a new automatic anti-aircraft design, and the large quadruple mortar is for both anti-submarine and anti-shore use. A light helicopter can land aft, and a commando unit of 80 men can be carried in addition to the maximum ship's company of 210 officers and men. *Balny* and *Commandant Bory* are equipped with Sigma free piston generators and gas turbines, while the others have four SEMT-Pielstick diesels coupled two by two on two shafts. All nine ships were built in Lorient Naval Dockyard. *Commandant Rivière*, the name-ship of the class, and the prototype, started assembly on the slip in Nov. 1956 and was commissioned to run her sea trials in Apr. 1959. *Commandant Bourdais* was commissioned as a fishery protection ship in Mar. 1962.

Standard displacement	*Full load displacement*	*Length*	*Beam*	*Draught*
1,750 tons	2,200 tons	334 feet	$37\frac{3}{4}$ feet	$12\frac{1}{2}$ feet

Main guns	*Secondary guns*	*Torpedo tubes*	*Anti-submarine weapons*
3–3.9 inch dual purpose	2–30 mm. anti-aircraft	6–21 inch	1–12 inch quadruple mortar

Propelling machinery	*Brake horse power*	*Speed*	*Complement*
4 SEMT-Pielstick diesels (seven ships) Sigma generators and gas turbines (*B.*, *C.B.*)	16,000 to 17,280	25 to 26.5 knots	180 to 210

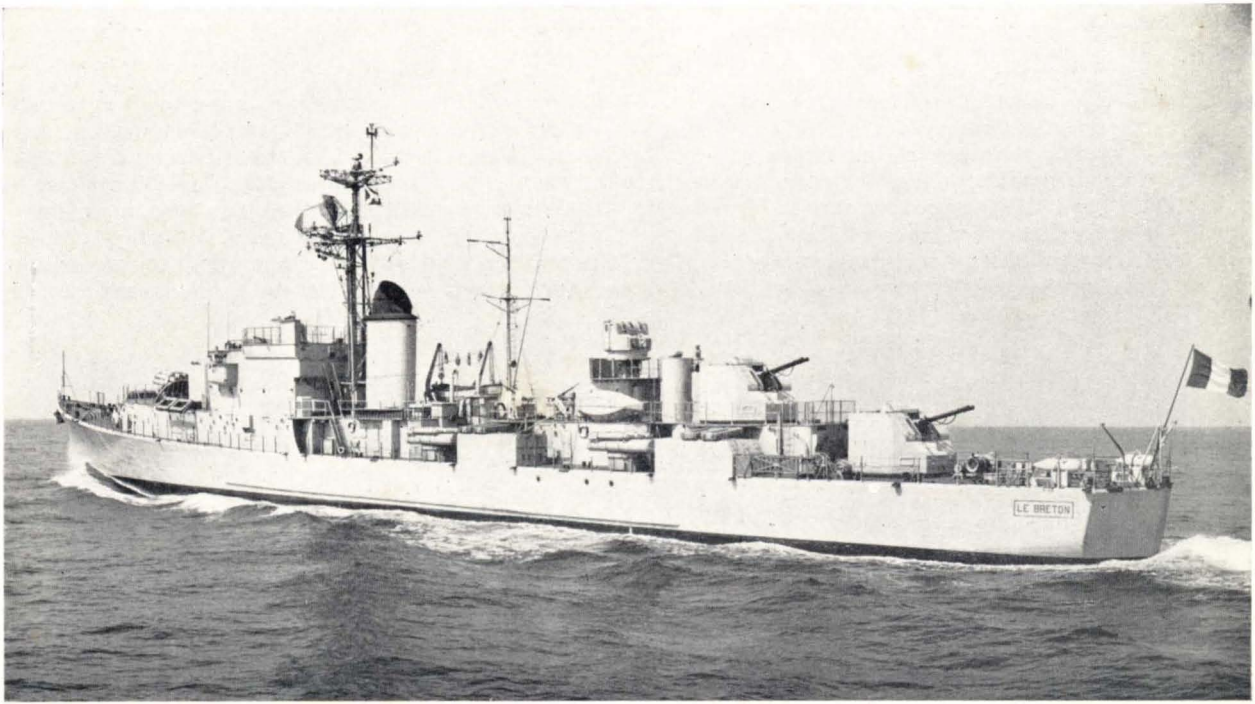


DOUDART DE LA GREE

LE BORDELAIS **L'AGENAIS** **LE BEARNAIS** **LE CHAMPENOIS** **LE PICARD**
LE BOULONNAIS **L'ALSACIEN** **LE BOURGUIGNON** **LE GASCON** **LE PROVENCAL**
LE BRESTOIS **LE BASQUE** **LE BRETON** **LE LORRAIN** **LE SAVOYARD**
LE CORSE **LE NORMAND** **LE VENDEEN**

The first four of these fast frigates, *Le Bordelais*, *Le Boulonnais*, *Le Brestois* and *Le Corse*, constituting the "E 50 Type" or "Le Corse" class, completed in 1955–6, were the first French escorts to be built since the Second World War. In design they closely resemble that of the United States destroyer escorts of the "Dealey" class. Intended as seagoing convoy escort vessels with a very large radius of action, they were designed as *Escorteurs Rapides Anti-Sousmarins*, but they were re-rated as *Escorteurs de Deuxième Classe* in 1951, as *Escorteurs* in 1953, and as *Escorteurs Rapides* in 1955. The fourteen later vessels known as the "E 52a Type" or "Le Normand" class, completed in 1956–9, have similar characteristics as regards hull and machinery but are easily distinguished in that they have the anti-submarine tubes aft and the heavy hedgehog or anti-submarine howitzer forward, while the "E 50" type have the ASM torpedo tubes forward. *L'Agenais*, *L'Alsacien*, *Le Béarnais*, *Le Provencal* and *Le Vendeen* have a 12-inch quadruple mortar in place of the sextuple Bofors howitzer and only four 57-mm. anti-aircraft guns. *L'Alsacien*, *Le Bordelais*, *Le Provencal* and *Le Vendeen* have the Strombos-Valensi modified funnel cap. Owing to financial difficulties the construction of the two frigates of the "E 52b" type, which were to have been provided under the 1957 naval estimates, was abandoned.

Standard displacement	*Full load displacement*	*Length*	*Beam*	*Draught*
1,290 tons	1,702 tons	327½ feet	33¾ feet	10 feet
Main guns	*Secondary guns*	*Torpedo tubes*	*Anti-submarine weapons*	*Complement*
4 or 6–57 mm. AA.	2–20 mm. AA.	12–21.7 inch	2 mortars, 12 inch quadruple mortar or sextuple howitzer	198
Propelling machinery	*Shaft horse power*	*Boilers*		*Speed*
Geared steam turbines	20,000	2		27 knots



LE BRETON

CANOPO **CASTORE** **CENTAURO** **CIGNO**

These vessels of the destroyer escort type have special anti-submarine and medium anti-aircraft armament. *Cigno* and *Castore* were built to Italian plans and specifications under the United States off-shore programme for the Italian Navy. All four ships are fitted with United States sonar gear. Although officially rated as frigates they are more like light destroyers or destroyer escorts (in fact *Cigno* and *Castore* originally had DE numbers — 1020 and 1021, respectively) and all four had D pennant numbers until 1960 when they were changed to F numbers, see below in the table. The 3-inch guns are in twin gunhouses of a new type with the two barrels in the vertical plane, one superfiring over the other. The new two-barrelled 76/62 calibre gun is Italian designed and built by Ansaldo, and its rate of fire is 80 rounds per minute with 3,200 feet per second muzzle velocity. This group of four ships is known as the "Centauro" class.

Standard displacement	*Full load displacement*	*Length*	*Beam*	*Draught*
1,680 tons	2,120 tons	339¼ feet	38 feet	11½ feet

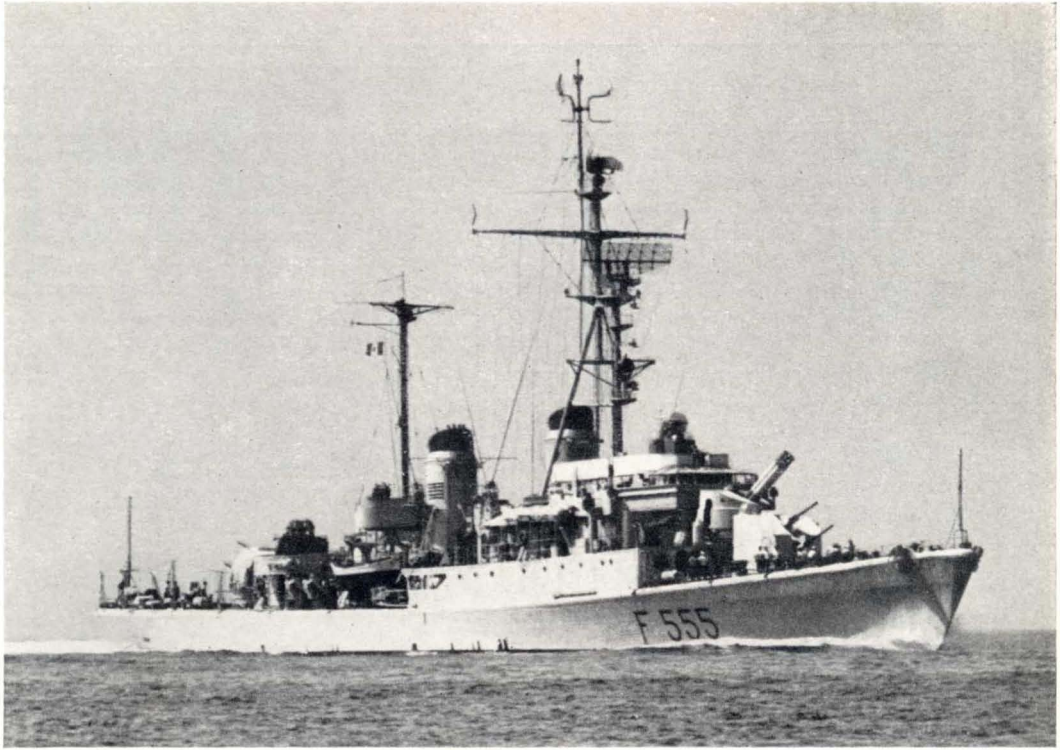
Main guns	*Anti-aircraft guns*	*Torpedo tubes*	*Anti-submarine armament*
4–3 inch	4–40 mm.	2–21 inch fixed	1 triple-barrelled long range depth charge mortar

Propelling machinery	*Shaft horse power*	*Boilers*	*Speed*	*Complement*
Geared steam turbines	22,000	2 Foster Wheeler	25 knots	200

Name	*Pennant No.*	*Begun*	*Launched*	*Completed*	*Builders*
CANOPO	F551 (ex-D570)	15 May 1952	20 Feb. 1955	1 Apr. 1958	Cantieri Navali di Taranto
CENTAURO	F554 (ex-D571)	31 May 1952	4 Apr. 1954	5 May 1957	Ansaldo, Leghorn
CIGNO	F555 (ex-D572)	10 Feb. 1954	20 Mar. 1955	7 Mar. 1957	Cantieri Navali di Taranto
CASTORE	F553 (ex-D573)	14 Mar. 1955	8 July 1956	14 July 1957	Cantieri Navali di Taranto

Note: Two frigates of improved "Centauro" type, *Circe* and *Climene*, are under construction, and two more units, *Perses* and *Polluce* are projected. Italy also has three former U.S. destroyer escorts of the "Bostwick" class, the *Aldebaran*, *Altair* and *Andromeda*, now rated as frigates.

CIGNO



CARLO BERGAMINI CARLO MARGOTTINI LUIGI RIZZO VIRGINIO FASAN

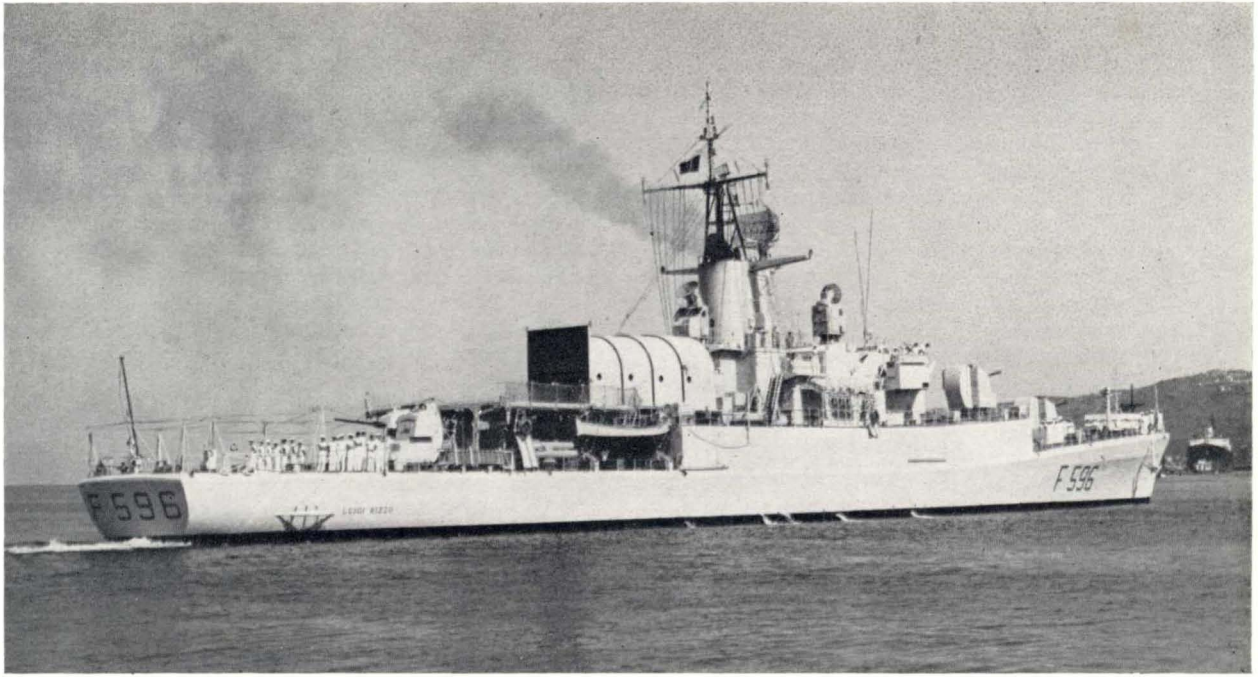
These remarkable looking vessels are light frigates of a new type with diesel motors instead of steam propulsion. Originally they were rated as *Corvette Veloci tipo II* (Fast Corvettes, "CV 2" Type), but their design plans underwent many amendments since they were first projected and laid down in 1957, and when they started trials in 1961 they were very different ships from those initially envisaged. Their armament and superstructure rises in a shallow pyramid from forecastle and quarter deck to a "mack" or combination mast-stack at the summit, abaft which is a small hangar for the helicopter operating from the flight apron on the shelter deck. In spite of their unconventional, indeed radical, layout they contrive a quite symmetrical appearance with a racy profile. Each of the 62-calibre fully automatic guns comprising the main armament has a rate of fire of 57 rounds per minute; and the single barrelled long range depth charge mortar has a range of over 1,000 yards. All the ships are fitted with Denny-Brown stabilisers.

Standard displacement	*Full load displacement*	*Length*	*Beam*	*Draught*
1,410 tons	1,650 tons	308¼ feet	37¼ feet	10⅓ feet

Guns	*Torpedo tubes*	*Anti-submarine weapons*	*Aircraft*
3–3 inch (single)	6 (two triple)	1 single-barrelled automatic long range depth charge mortar	light helicopter

Propelling machinery	*Brake horse power*	*Speed*	*Complement*
4 Tosi diesels (*C. Bergamini* and *L. Rizzo*) 4 Fiat diesels (*C. Margottini* and *V. Fasan*)	16,000	26.5 knots	160

Name	*Begun*	*Launched*	*Completed*	*Builders*
CARLO BERGAMINI	16 July 1959	16 June 1960	1962	San Marco, C.R.D.A., Trieste
CARLO MARGOTTINI	26 May 1957	12 June 1960	1962	Navalmeccanica, Castellammare
LUIGI RIZZO	26 May 1957	6 Mar. 1960	1961	Navalmeccanica, Castellammare
VIRGINIO FASAN	6 Mar. 1960	9 Oct. 1960	1962	Navalmeccanica, Castellammare



LUIGI RIZZO

AUGSBURG BRAUNSCHWEIG EMDEN KARLSRUHE KÖLN LUBECK

The Köln was the prototype and name-ship of a novel class of fast anti-submarine frigates or escort vessels ordered in March 1957 and all built by the same shipyard for the *Bundesmarine*. Of both handsome and racy appearance, their construction is more reminiscent of that of torpedo boat destroyers than of frigates, and their evenly distributed armament gives them a symmetrical layout. Their propelling machinery consists of a combined diesel engine and gas turbine plant comprising four 16-cylinder M.A.N. diesels aggregating 12,000 brake horse power coupled to two Brown Boveri gas turbines developing 26,000 horse power so that the two shafts fitted with variable pitch propellers give them a total shaft horse power equal to a speed of 29 to 32 knots maximum. Classed as *Geleitboote*, with "F" pennant numbers, they are the first frigates built for the Federal German Navy. All the ships of this class are named after towns of West Germany.

(The Federal German Navy also has seven former British frigates, namely *Graf Spee* (ex-H.M.S. *Flamingo*), *Hipper* (ex-H.M.S. *Actaeon*), *Scharnhorst* (ex-H.M.S. *Mermaid*), and *Scheer* (ex-H.M.S. *Hart*), all of the "Black Swan" class; and *Brommy* (ex-H.M.S. *Eggesford*), *Gneisenau* (ex-H.M.S. *Oakley*) and *Raule* (ex-H.M.S. *Albrighton*) of the "Hunt" class).

Standard displacement	*Full load displacement*	*Length*	*Beam*	*Draught*
2,100 tons	2,550 tons	357⅓ feet	34⅛ feet	12 feet

Main guns	*Anti-aircraft guns*	*Anti-submarine weapons*	*Torpedo tubes*
2–3.9 inch (100 mm.) (single)	6–40 mm. (2 twin, 2 single)	2 four-barrelled depth charge mortars (Bofors rocket launchers)	2 for ASW torpedoes

Propelling machinery	*Shaft horse power*	*Speed*	*Complement*
4–16 cyl. M.A.N. diesels, B.H.P. 12,000 2 Brown Boveri gas turbines, H.P. 26,000	38,000	32 knots	210

Name	*No.*	*Launched*	*Name*	*No.*	*Launched*	*Builders*
AUGSBURG	F 222	15 Aug. 1959	KARLSRUHE	F 223	24 Oct. 1959	All by H. C.
BRAUNSCHWEIG	F 225	3 Feb. 1962	KOLN	F 220	6 Dec. 1958	Stulcken Sohn,
EMDEN	F 221	21 Mar. 1959	LUBECK	F 224	23 July 1960	Hamburg

KÖLN

ISUZU **MOGAMI** **IKAZUCHI** **AKEBONO**
KITAKAMI **OHI** **INAZUMA**

The four vessels of the "Mogami" or "River" class are frigates or destroyer escorts of a new design. *Isuzu* and *Mogami* were completed in 1961, and *Kitakami* and *Ohi* are being completed in 1964. All new frigates of the DE type are named after rivers, like the old light cruisers. This naming system applied in 1960.

The two units of the "Ikazuchi" or "Thunder" class are diesel powered escort vessels, and unlike the third vessel built under the initial post-war construction programme, the steam turbine propelled *Akebono*, see below, which has two funnels, these diesel boats have only one funnel. Both were completed in 1956.

The *Akebono* (meaning "Dawn"), was the first destroyer escort laid down since the end of the Second World War for the Japanese Maritime Self-Defence Force. Also completed in 1956, she looks more like a destroyer than do her half-sisters *Ikazuchi* and *Inazuma*, see above.

Japan also has 21 other vessels listed under the frigate category:—

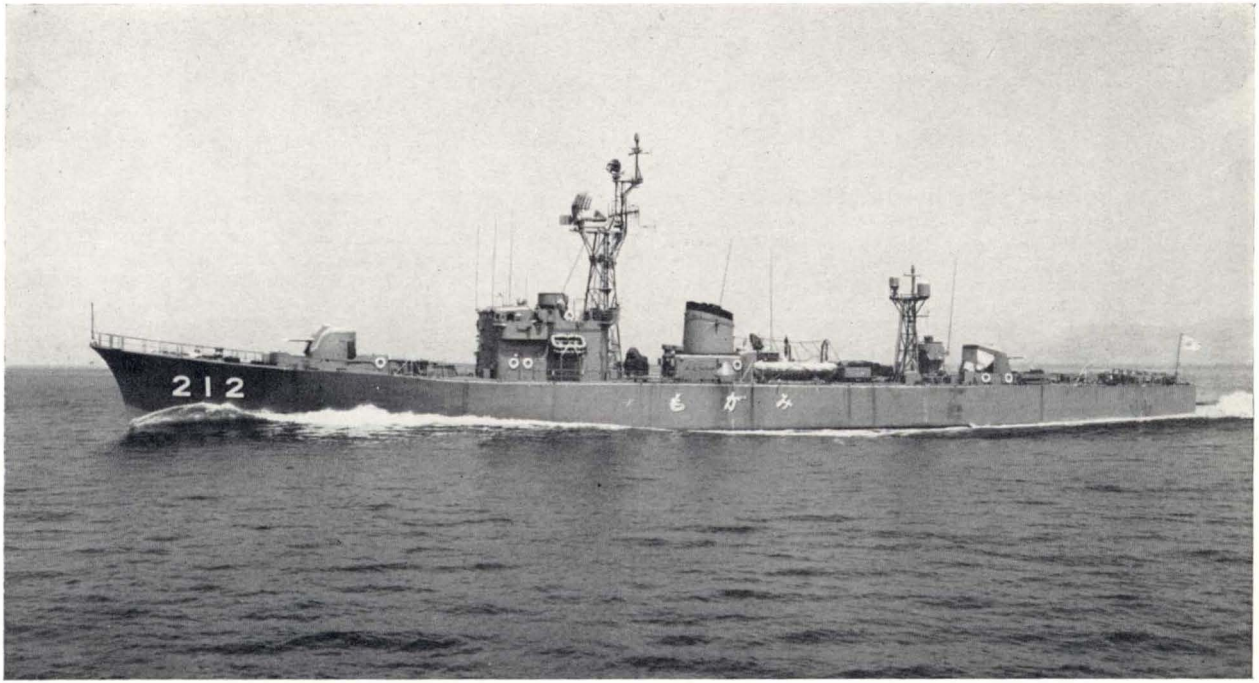
Wakaba, an escort destroyer of the former Imperial Japanese Navy, sunk soon after she was completed in 1945, but subsequently raised and reconstructed in 1956 and now rated as a radar experimental ship;

Asahi and *Hatsuhi*, ex-U.S. destroyer escorts of the "Bostwick" class; and *Buna*, *Kaede*, *Kashi*, *Kaya*, *Keyaki*, *Kiri*, *Kusu*, *Maki*, *Matsu*, *Momi*, *Nara*, *Nire*, *Sakura*, *Shii*, *Sugi*, *Tochi*, *Tsuge* and *Ume*, all ex-U.S. patrol frigates of the "Tacoma" class.

Standard displacement	*Full load displacement*	*Length*	*Beam*	*Draught*
"Mogami" class: 1,490 tons	1,700 tons	318¼ feet	33½ feet	11 feet
"Ikazuchi" class: 1,080 tons	1,300 tons	287 feet	28½ feet	10¼ feet
Akebono: 1,070 tons	1,350 tons	301 feet	28½ feet	11 feet

Main and anti-aircraft guns	*Torpedo tubes, launchers*	*Anti-submarine weapons*
4–3 inch AA. (two twin)	4–21 inch (quad), 2 homing	1 rocket launcher, 1 d.c.t., 1 d.c.r.
2–3 inch d.p.; 4–40 mm. AA.		1 hedgehog, 4 K-guns, 2 d.c. racks
2–3 inch d.p.; 3–40 mm. AA.		1 hedgehog, 4 K-guns, 2 d.c. racks

Propelling machinery	*Shaft horse power*	*Boilers*	*Speed*	*Complement*
Diesel engines	16,000		26 knots	156
Diesel engines	12,000		25 knots	145
Geared steam turbines	18,000	2 Foster Wheeler	28 knots	193



MOGAMI

"Annapolis" Class	"Mackenzie" Class	"Restigouche" Class		"St. Laurent" Class	
ANNAPOLIS	MACKENZIE	CHAUDIERE	RESTIGOUCHE	ASSINIBOINE	SAGUENAY
NIPIGON	QU'APPELLE	COLUMBIA	ST. CROIX	FRASER	ST. LAURENT
	SASKATCHEWAN	GATINEAU	TERRA NOVA	MARGAREE	SKEENA
	YUKON	KOOTENAY		OTTAWA	

The "St. Laurent" class were officially classed as major warships and as such were the first to be designed completely in Canada. These anti-submarine destroyer escorts or frigates of a high speed type were built primarily for the detection and destruction of modern fast submarines, and in evolving their design much assistance was received from the Royal Navy and the United States Navy. In function the vessels supersede the frigates and corvettes of the Second World War, and like the corvettes their design was worked out so that in the event of emergency they could be produced rapidly and in quantity. In speed, manoeuvrability and weapons the ships fulfil all the requirements of their class for modern sea warfare. The design provided for flush deck, low bridge, considerable use of aluminium instead of steel for the superstructure, fittings and furniture, and compartmented hull. The "Restigouche" class are basically similar to the "St. Laurent" class, but there is a considerable difference in the bridge structure, which is higher at the break of the forecastle and drops down to a new breakwater deck on which the new British 3 inch, 70 calibre twin gun in enclosed turret is mounted and over which it has better vision. There is also a difference in the shelter deck superstructure and fittings abaft the funnel, wing platforms on the foremast, director and look-out wings abaft the bridge, and improved sonar gear. New features of the "Mackenzie" class include improved habitability through design change and reduced complement, improved air conditioning, and the extension of the pre-wetting system (to counter radio-active fallout) to cover the entire exposed area of the ship. The last two ships of the original "Mackenzie" class, *Annapolis* and *Nipigon*, which will incorporate variable depth sonar, cutaway stern, and helicopter platform, have been separated into a new class. All seven ships of the "St. Laurent" class will be similarly reconstructed with helo flight apron and VDS, twin athwartships funnels being stepped to permit the forward extension of the hangar.

Standard displacement	*Full load displacement*	*Length*	*Beam*	*Draught*
"St. L." class 2,263 tons	2,800 tons	366 feet	42 feet	13 feet
"Rest" class 2,366 tons	2,900 tons	366 feet	42 feet	13¼ feet

Anti-submarine weapons	*Anti-aircraft guns*	*Torpedoes*	*Helicopter*
2 "Limbo" three-barrelled depth charge mortars	4-3 inch (*St. L., R.*)	Homing	*Ann.* and *St. L.* cl.

Propelling machinery	*Shaft horse power*	*Boilers*	*Speed*	*Complement*
Geared steam turbines	30,000	2 water tube	28 knots	210

Completed:—St. Laurent class 1955–57; Restigouche class 1958–59; Mackenzie class 1962–64.

MACKENZIE

CHARLES BERRY	**BAUER**	**CROMWELL**	**HAMMERBERG**	**JOHN WILLIS**
CLAUD JONES	**BRIDGET**	**DEALEY**	**HARTLEY**	**JOSEPH K. TAUSSIG**
JOHN R. PERRY	**COURTNEY**	**EVANS**	**HOOPER**	**LESTER**
McMORRIS				**VAN VOORHIS**

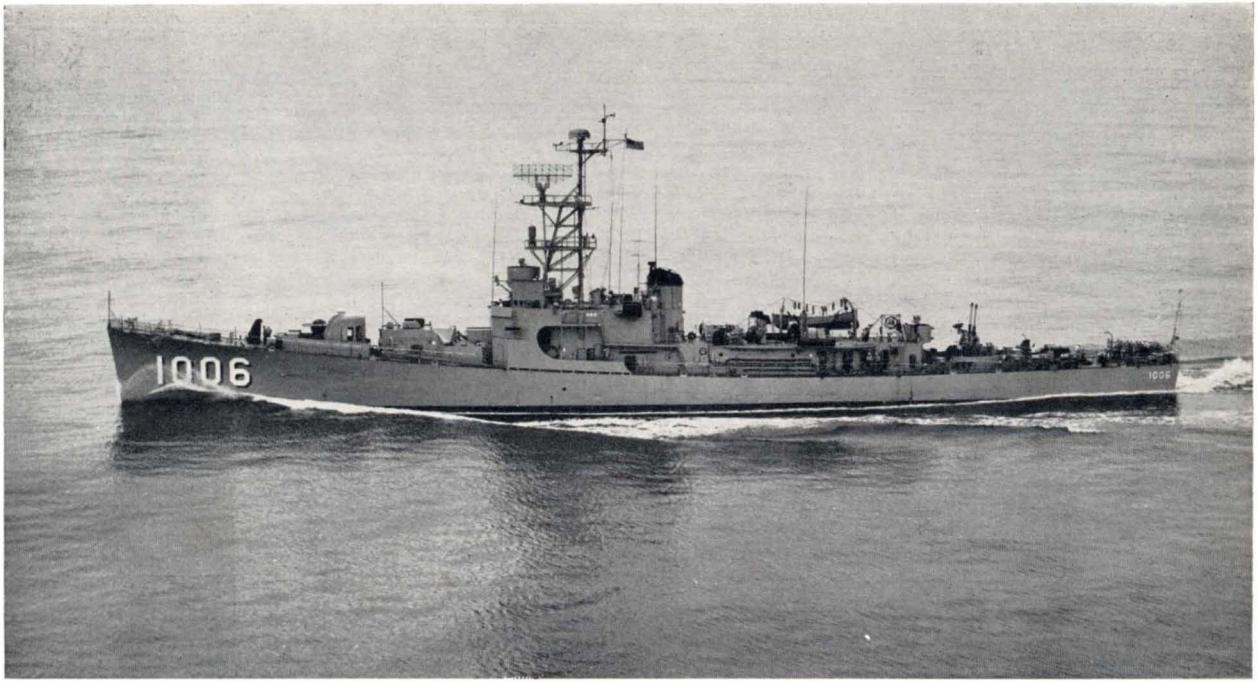
Intended for fast convoy protection, these ships were designed for mass production in the event of war and can be considered as the contemporaries of the British 2nd Rate anti-submarine frigates. The distinctive type letter symbol "DE", denoting the category to which these ships belong, stands for "Destroyer Escort", but in the United States official list of classifications of naval vessels they are grouped under the generic heading of "Patrol Ships" with the specific classification of "Escort Ships". However, they approximate to the smaller ships of the frigate category in British and other navies. With a single engine-room, single screw, twin rudders and all aluminium superstructure, saving forty per cent in weight, they are lavishly equipped with electronic gear. *Charles Perry*, *Claud Jones*, *John R. Perry* and *McMorris* ("Claud Jones" class) are of different type, being propelled by diesels instead of turbines, as in the thirteen ships of the "Dealey" and "Evans" group.

	Standard displacement	*Full load displacement*	*Length*	*Beam*	*Draught*
"Dealy" group:	1,450 tons	1,914 tons	314½ feet	36¾ feet	13¾ feet
"Claud Jones" class:	1,450 tons	1,750 tons	312 feet	39 feet	14¼ feet

	Guns	*Anti-submarine weapons*	*Complement*	*Completed*
"Dealy" group:	4–3 inch dual purpose	1 launcher (2 British "Squids" in Dealey)	149 to 170	1954–1958
"Claud Jones" class:	2–3 inch dual purpose	2 launchers	175	1959–1960

	Propelling machinery	*Shaft horse power*	*Boilers*	*Speed*
"Dealey" group:	1 set De Laval geared turbines	20,000	2 Foster-Wheeler	25 knots
"Claud Jones" class:	4 Fairbanks-Morse diesels	12,000		21 knots

Notes: Two bigger escort ships being completed, *Bronstein* and *McCloy*, displace 1,640 tons. Ten even larger escort ships of the "Garcia" class, displacing 2,600 tons are under construction, and six guided missile armed escort ships of the "Brooke" class are projected.



DEALEY

"Rudderow" Class

CHARLES H. KIMME
COATES
DANIEL A. JOY
DE LONG
DAY
EUGENE E. ELMORE
GEORGE A. JOHNSON
HODGES
HOLT
JOBB
LESLIE L. B. KNOX
LOUGH
McNULTY
METIVIER
PARLE
PEIFFER
RILEY
RUDDEROW
THOMAS F. NICKEL
TINSMAN

"John C. Butler" Class

ABERCROMBIE
ALBERT T. HARRIS
ALVIN C. COCKERELL
BIVIN
CECIL J. DOYLE
CHARLES E. BRANNON
CHESTER T. O'BRIEN
CONKLIN
CORBESIER
CROSS
DENNIS
DOUGLAS A. MUNRO
DOYLE C. BARNES
DUFILHO
EDMONDS
EDWARD H. ALLEN
EDWIN A. HOWARD
FRENCH
GENTRY
GEORGE E. DAVIS
GILLIGAN
GOSS
GRADY
HAAS
HANNA
HOWARD F. CLARK
HEYLIGER
JACCARD
JACK MILLER
JESSE RUTHERFORD
JOHN C. BUTLER
JOHN L. WILLIAMSON
JOHNNIE HUTCHINS
JOSEPH E. CONNOLLY
KENDAL C. CAMPBELL
KENNETH M. WILLETT
KEY
LA PRADE
LAWRENCE C. TAYLOR
LE RAY WILSON
LELAND E. THOMAS
LEWIS
LLOYD E. ACREE
MACK
MAURICE J. MANUEL
MELVIN R. NAWMAN
McGINTY
NAIFEH
O'FLAHERTY
OLIVER MITCHELL
OSBERG
PRATT
PRESLEY
RAYMOND
RICHARD M. ROWELL
RICHARD S. BULL
RICHARD W. SUESENS
RIZZI
ROBERT BRAZIER
ROBERT F. KELLER
ROLF
ROMBACH
SILVERSTEIN
STAFFORD
STRAUSS
TABBERER
THADDEUS PARKER
TRAW
TWEEDY
ULVERT M. MOORE
VANDIVIER
WAGNER
WALTER C. WANN
WALTON
WILLIAM SEIVERLING
WILLIAMS
WOODSON

"Buckley" Class

AHRENS
ALEXANDER J. LUKE
BORUM
BUCKLEY
COOLBAUGH
CRONIN
CURRIER
DAMON M. CUMMINGS
DARBY
DURIK
EARL V. JOHNSON
EICHENBERGER
FIEBERLING
FOGG
FOREMAN
FOSS
FOWLER

o

DE LONG

"Buckley" Class—contd.
FRANCIS M. ROBINSON
FRYBARGER
GENDREAU
GEORGE
GILLETTE
GREENWOOD
GUNASON
HARMON
HENRY R. KENYON
HOLTON
JACK W. WILKE
JAMES E. CRAIG
J. DOUGLAS BLACKWOOD
JENKS
LOESER
LOVELACE
MAJOR
MALOY
MANNING
MARSH
NEUENDORF
OSMUS
OTTER
PAUL G. BAKER
RABY
REUBE
ROBER
SCOTT
SCROGGIS
SPANGENBURG
SPANGLER
THOMASON
VAMMEN
VARIAN
WEEDEN
WHITEHURST
WILLIAM C. COLE
WILLIAM T. POWELL
WILLMARTH
WISEMAN

Three very similar types of escort vessels, the "Buckley" class forming the link between the two later types and the original "Edsall" and "Bostwick" classes later described. The "Buckley" class have tall funnels, whilst the others have short. Ten of the fifty "Buckley" type ships mount two 5-inch guns, the others having three 3-inch, as in the "Edsall' type.' Ninety-two of the "Buckley" and "Rudderow" classes were converted into fast transports and nine units were converted into radar picket escort vessels (DER). All approximate to the British war-built frigate category, except that they are faster. *Formoe* and *McCoy Reynolds* were transferred to Portugal in 1957.

Standard displacement	*Full load displacement*	*Length*	*Beam*	*Draught*
1,350 to 1,450 tons	2,100 to 2,230 tons	306 feet	37 feet	11 to 14 feet

Main guns	*Anti-aircraft armament*	*Anti-submarine weapons*	*Complement*
2–5 inch or 3–3 inch	8–40 mm., 4–20 mm. or 2–40 mm., 6 or 10–20 mm.	Depth charge throwers	170 to 187

Propelling machinery	*Shaft horse power*	*Boilers*	*Speed*	*Completed*
Geared steam turbines	12,000	2	24 knots	1943-45

"Edsall" Class
BLAIR
BRISTER
BROUGH
CALCATERRA
CAMP
CHAMBERS
CHATELAIN
COCKRILL
DALE W. PETERSEN
DANIEL
DOUGLAS L. HOWARD
DURANT
EDSALL
FALGOUT
FARQUHAR
FESSENDEN
FINCH
FLAHERTY
FORSTER
FROST
HAMMAN
HARVESON
HAVERFIELD
HERBERT C. JONES
HILL
HISSEM
HOWARD D. CROW
HURST
HUSE
INCH
JACOB JONES
JANSSEN
JOYCE
J. RICHARD WARD
J. R. Y. BLAKELY
KEITH
KIRKPATRICK
KOINER
KRETCHMER
LANCING
LOWE
MARCHAND
MARTIN H. RAY
MENGES
MERRIL
MILLS
MOORE
MOSLEY
NEUNZER
NEWELL
O'REILLY
OTTERSTETTER
PETERSEN
PETTIT
PILLSBURY
POOLE
POPE
PRICE
PRIDE
RAMSDEN
RHODES
RICHEY
RICKETTS
ROBERT E. PEARY
ROY O. HALE
SAVAGE
SELLSTROM
SLOAT
SNOWDEN
STANTON
STEWART
STOCKDALE
STRICKLAND
STURTEVANT
SWASEY
SWENNING
THOMAS J. GARY
TOMICH
VANCE
WILHOITE
WILLIS

"Bostwick" Class
ACREE
BOOTH
CARROLL
COFFMAN
COONER
EARL K. OLSEN
HILBERT
KYNNE
LAMONS
LEVY
McCLELLAND
McCONNELL
MICKA
NEAL A. SCOTT
OSTERHAUS
OSWALD
PARKS
ROBERTS
SNYDER
STRAUB
TILLS
TRUMPETER

These two classes represent the original Destroyer Escort design developed for escort duties with convoys and task forces. Ships of these classes will be found in the Brazilian, Chinese Nationalist, French, Greek,

Italian, Japanese, Netherlands, Peruvian, South Korean and Uruguayan navies. Several units were also serving with the U.S. Coast Guard. Distinguishable from the later types by their tall funnels and 3-inch mounts in gun pits, these vessels could be confused with the 3-inch gunned ships of the "Buckley" class. Diesel or diesel-electric drive with a somewhat lower speed than the later types. Thirty-four units of the "Edsall" class were converted into radar picket escort vessels (DER). All units of the "Edsall" and "Bostwick" classes were completed in 1943–4.

	Standard displacement	*Full load displacement*	*Length*	*Beam*	*Draught*
"Bostwick" class:	1,240 tons	1,900 tons	306 feet	37 feet	14 feet
"Edsall" class:	1,200 tons (1,590 tons DER)	1,850 tons	306 feet	37 feet	11 feet

	Main guns	*Anti-aircraft guns*	*Torpedo tubes*	*Anti-submarine weapons*
"Bostwick" class:	3–3 inch	2–40 mm., 4–20 mm.	3–21 inch in some	Depth charge throwers
"Edsall" class:	3–3 inch (2–3 inch in DER)	8–40 mm., 4–20 mm. (only 6–20 mm. in DER)	Removed	"Hedgehog" and racks in DER

Propelling machinery	*Brake horse power*	*Speed*	*Complement*
"Bostwick" class Diesel-electric	6,000	20 knots	150
"Edsall" class: Diesel	6,000	21 knots	149 (187 in. DER)

Note: Vandivier and *Wagner*, originally of the "John C. Butler" class, were completed as Radar Picket Escort Vessels (DER). *Alexander J. Luke, Buckley, Fogg, Reuben, James, Robert I. Payne, Spangenburg* and *William T. Powell* of the "Buckley" class, and the following vessels of the "Edsall" class were converted to Radar Picket Escort Vessels (DER):—
Blair, Brister, Calcaterra, Camp, Chambers, Durant, Falgout, Fessenden, Finch, Forster, Harveson, Haverfield, Hissem, Joyce, Kirkpatrick, Koiner, Kretchmer, Lancing, Lowe, Mills, Newell, Otterstetter, Pillsbury, Price, Ramsden, Rhodes, Roy O. Hale, Savage, Sellstrom, Strickland, Sturtevant, Thomas J. Gary, Vance and *Wilhoite.*

Of the "Bostwick" class, *Muir* and *Sutton* were transferred to the South Korean Navy in 1956, and *Hemminger* was transferred to the Royal Thai Navy in 1959.

SUBMARINES

It was largely John P. Holland, a British emigrant to the United States, who invented the modern type of submarine towards the end of the nineteenth century—in essence a submersible torpedo boat, but it was not until the beginning of the twentieth century that the submarine became a practical proposition and took its place as an accepted and distinct category of warship. The first British submarines were of the Holland design, his rights having been acquired by the Admiralty. Five experimental boats were built to his specifications in 1901–2, of 120 tons with a length of 63½ feet, one torpedo tube in the bow (five torpedoes carried), petrol engines giving a speed of 9 knots and storage batteries and electric motors giving a submerged speed of 7 knots. The first development was "A 1", originally Holland No. 6, 180 tons, 11 knots. A 2–A 13, launched 1903–6, 204 tons, 12 knots, had two torpedo tubes. B 1–B 11 and C 1–C 38, 1906–9, displaced 280 tons with a speed of 13 knots. But in the following class, D 1–D 8, 1908–11, there was a vast improvement in design and a leap in size, power, speed and armament. External side ballast tanks were introduced, diesel engines driving twin screws adopted, a stern torpedo tube fitted and bow tubes disposed one above the other. They were safer, had greater habitability and a 12-pounder gun was mounted experimentally. Of 550 tons surface displacement and 620 tons submerged they had a surface speed of 16 knots (10 knots submerged). Considering half a century has elapsed since they were designed it is surprising how little submarines have changed fundamentally. In the "E" class, which continued to be built until 1916–17, broadside tubes were introduced and the hull was sub-divided by watertight transverse bulkheads. Of the Admiralty wing-tank type they displaced 662/807 tons with three to five 18-inch tubes (most mounted a 12-pounder gun, a few carried 20 mines) and a speed of 15/10 knots. The submarine war of 1914–18 was largely fought with this class. No fewer than 55 "E" boats were built. As many as 27 were lost during the war but their record was one of brilliant achievements. There was a brief reversion to the small type with the three coastal submarines of the "F" class, 353/525 tons, three tubes, 14½/8¾ knots,

the first of the Admiralty double hull design; then a volte-face to the "G" class, 700/975 tons, 14/10 knots, whose armament included a 21-inch tube, introduced in submarines for the first time, as well as four 18-inch tubes (bow and beam) and a 3-inch anti-aircraft gun. These were the first genuine ocean-going boats in the Royal Navy. The "H" class were of the single-hulled Holland type. Ten were of 364/434 tons with a speed of 13/11 knots and four 18-inch tubes; 24 of modified Admiralty design were of 410/500 tons with four 21-inch tubes. Successful and popular, reputed to be the fastest divers in the Service, nine of them served in the Second World War. The "J" class, 1915–17, were large ocean-going submarines, the fastest afloat. Of 1,260/1,820 tons and armed with six 18-inch tubes and a 4-inch gun, they had a surface speed of 19½ knots. The giant steam-driven "K" class displaced 1,880/2,650 tons with an armament of eight 18-inch tubes, a 4-inch gun and a 3-inch A.A. weapon, two Yarrow boilers and geared turbines giving them a surface speed of 24 knots. In 1916–18 they were the largest and fastest submarines in the world. *K* 26, built 1918–24, of 2,140/2,770 tons with three 4-inch guns, two smaller weapons and ten 21-inch tubes, was practically a submersible light cruiser. In the "L" class, built 1917–22, a return was made to diesels and normal sea-going dimensions, 760/1,080 tons, one 4-inch gun, four 21-inch tubes, 17½/10½ knots. In all-round qualities they were the most successful type produced, and three served in the 1939–45 war. The three vessels of the "M" class represented an attempt to produce submarine battleships or monitors. Of 1,600/1,950 tons they originally carried a 12-inch gun as well as a 3-inch gun and four 18-inch tubes at a speed of 15½/9½ knots. *M1*, completed in 1918, was lost in 1925 and the big guns were removed from the other two freaks. *M2*, converted to carry a seaplane and fitted with a hangar and crane, was lost in 1932. *M 3* was transformed into a minelayer. The twelve "R" class boats completed in 1918, of 420/500 tons, were faster below water than on the surface (15 knots submerged, 10 knots surfaced). During 1914–18 no fewer than 54 British submarines were lost.

The unique giant British submarine *X1*, built 1921–4, was 363½ feet long and 30 feet in beam with a displacement of 2,525/3,600 tons and carried four 5.3-inch guns in two revolving shields, two smaller guns and six 21-inch torpedo tubes. Diesels of 7,000 B.H.P. gave her a speed of 19½ knots. She was the prototype underwater cruiser. When normal submarine building was resumed, submarines for the first time were given names, with the same initial letter according to class. The 19 boats of the "O", "P" and "R" classes were of a standard pattern, up to 1,475 tons on the surface and up to 2,040 tons submerged, with eight 21-inch tubes, a 4-inch gun and surface speeds up to 17½ knots. *Thames, Severn* and *Clyde*, 1,850/2,710 tons, 22½ knots were the first submarines to exceed a speed of 21 knots (except the steam "K" class). The six "Porpoise" class boats were submarine minelayers completed 1933–39. Another descent to small dimensions was made with the "S" and "U" classes of 814/990 and 658/740 tons, respectively, with seven and four tubes and a 3-inch gun. Some 115 improved vessels of this type were completed during the Second World War. Later vessels of the "T", "A", "Porpoise", "O" and "Dreadnought" classes are described in the following pages. 77 British submarines were lost during the Second World War. There are 50 submarines in the Royal Navy today, most of which are fitted with the "Snort" breathing equipment. The United States has 180 submarines, including 30 nuclear powered vessels, displacing up to 7,000/8,200 tons. Russia has 475 submarines.

Recently there have been notable advances in the operational capabilities and technical development of United States submarines, with transarctic navigation and continuous submergence records of nuclear powered submarines, and rapid progress in the construction of giant nuclear powered fleet ballistic missile submarines constituting powerful underwater cruisers. All this submarine activity in the United States Navy, taken in conjunction with the greatly expanded Russian submarine fleet, points to the certainty of intensive *sub aqua* warfare in any future hostilities. In future all new United States submarines will be nuclear powered and it is planned to have 81 of such vessels by 1967.

DREADNOUGHT **VALIANT**

History was made when H.M.S. *Dreadnought*, Great Britain's first nuclear powered submarine moved under nuclear power on 1 December 1962. She is the Royal Navy's first true submarine, as distinct from a submersible. Her primary role is as a submarine hunter-killer, for which purpose she is equipped with the latest developments in underwater weapons and detection. Her armament of torpedo tubes are all internal and all in the bow. Her main propelling machinery comprises a nuclear reactor of the pressurised water cooled type generating steam which through geared turbines drives a single shaft. The supply of this machinery was made under a contract between the Westinghouse Electric Corporation in the United States and Rolls-Royce Ltd. in Great Britain. She also has auxiliary machinery consisting of a diesel generator and an electric propulsion motor for alternative drive. Almost every electrical and mechanical part of the propulsion machinery is installed in duplicate so as to minimise the inconvenience in the event of breakdowns. In addition every control feature of the power plant and of the submarine is duplicated. These innovations ensure an extremely high standard of reliability which, combined with the need to refuel only at long intervals, give her the ability to undertake patrols of particularly long endurance at continuous high underwater speeds. She is fitted with an inertial navigation system and with means of measuring her depth below ice. Accommodation for her crew is of a standard which it was impossible to attain in any previous British submarine.

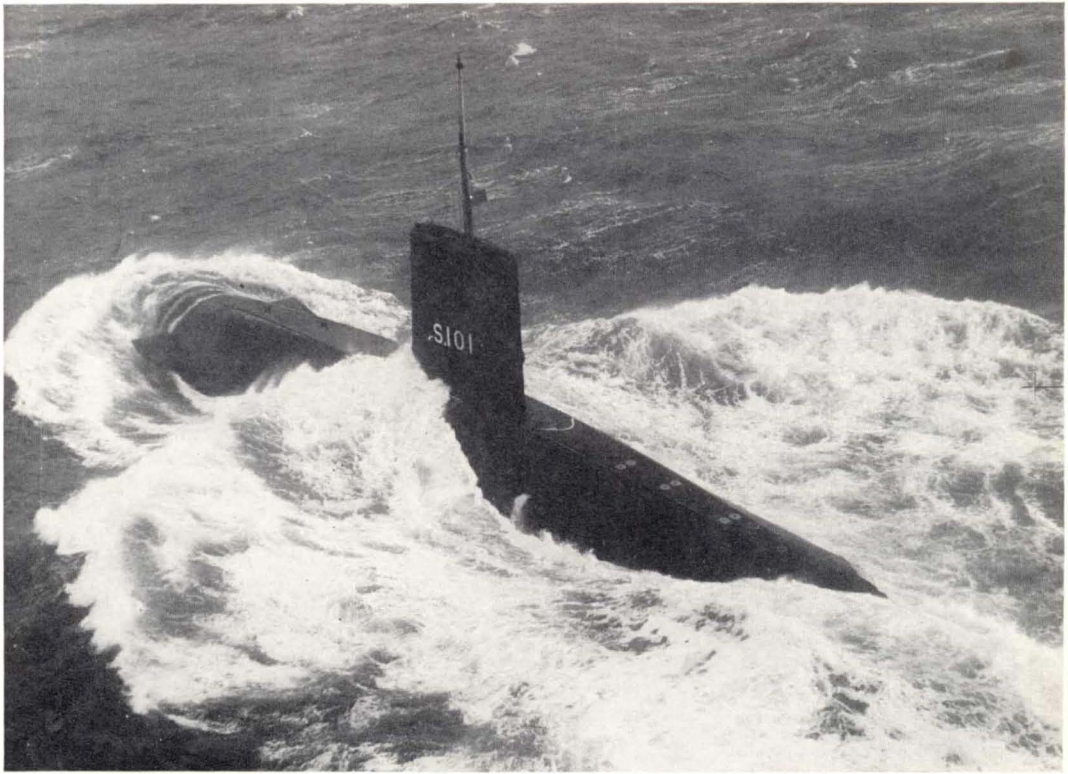
H.M.S. *Valiant* will be the first nuclear powered submarine to be designed and built entirely in Great Britain. She will be larger than *Dreadnought*.

A third entirely British designed nuclear powered submarine was ordered from Vickers-Armstrongs Ltd. on 12 December 1962.

Surface displacement	*Submerged displacement*	*Length*	*Beam*	*Draught*
3,500 tons	4,000 tons	265¾ feet	32¼ feet	26 feet
Torpedo tubes	*Propelling machinery*	*Nuclear reactors*	*Speed*	*Complement*
6–21 inch	Geared steam turbines Diesel generators Electric motors	1 pressurised water cooled	30 knots	88

Name	*Begun*	*Launched*	*Completed*	*Builders*
DREADNOUGHT	12 June 1959	21 Oct. 1960	17 Apr. 1963	Vickers-Armstrongs Ltd., Barrow
VALIANT	22 Jan. 1962			Vickers-Armstrongs Ltd., Barrow

DREADNOUGHT



OBERON	**ONSLAUGHT**	**ORACLE**	**OTUS**	**CACHALOT**	**PORPOISE**
OCELOT	**ONYX**	**ORPHEUS**		**FINWHALE**	**RORQUAL**
ODIN	**OPOSSUM**	**OSIRIS**		**GRAMPUS**	**SEALION**
OLYMPUS	**OPPORTUNE**	**OTTER**		**NARWHAL**	**WALRUS**

First operational submarines of post-war design, capable of continuous submerged patrol in any part of the world. Design of hull and superstructure facilitated high underwater speed and great diving depth. Long endurance, both surfaced and submerged, whether on batteries or snorting. Propelled on the surface, or when snorting, by diesel-electric drive from Admiralty Standard Range diesels, and from a large battery driving the motors when submerged. Snort equipment designed to give maximum snort-charging facilities and to operate in rough sea conditions. Both air and surface warning radar can be operated at periscope depth as well as when surfaced. General habitability is of the highest standard, with strip lighting and air conditioning plant providing drying and either heating or cooling air for for arctic or tropical service. Oxygen replenishment and carbon dioxide and hydrogen eliminators allow the boats to remain totally submerged without using snort for several days. Apparatus to distil fresh water from sea water for drinking, and ample stowage for stores and provisions enable them to remain on patrol for months without outside support. The electrical propulsion system is of more advanced design than employed previously. All eight boats of the "Porpoise" class were completed in 1958–61.

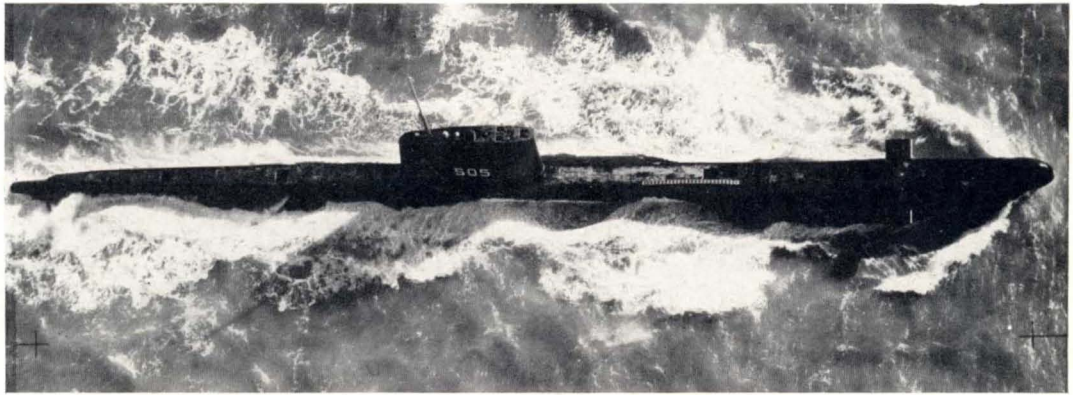
The thirteen new submarines of the "Oberon" class are practically repeat editions of the "Porpoise" class, but they have improved detection equipment and are capable of firing homing torpedoes. For the first time in British submarines plastic was used in the superstructure construction. Before and abaft the bridge the superstructure is of glass fibre laminate. The superstructure of *Orpheus*, the first of the class completed in Nov. 1960 is of light aluminium alloy.

Surface displacement	*Submerged displacement*	*Length*	*Beam*	*Draught*
2,030 tons	2,100 tons	295¼ feet	26½ feet	18 feet

Forward torpedo tubes	*After torpedo tubes*	*Propelling machinery*	*Complement*
6–21 inch	2–21 inch	A.S.R. diesels, electric motors	68 *to* 71

OTTER

FINWHALE



ACHERON	**ALCIDE**	**AMBUSH**	**ANDREW**	**ASTUTE**
AENEAS	**ALDERNEY**	**AMPHION**	**ARTEMIS**	**AURIGA**
ALARIC	**ALLIANCE**	**ANCHORITE**	**ARTFUL**	**AUROCHS**

Originally there were to have been forty-six units of this "A" class, all designed for Pacific operations; but the war in the Far East was over before any ship of the class was able to reach it, and in consequence thirty units were cancelled or scrapped before completion. The *Affray* was lost with all hands in the English Channel in April 1951. These ships, completed in 1945–8, offered a variety of appearances until 1955, appearing with or without guns according to operational and experimental requirements, but since then all except one have been rebuilt and streamlined in the same way as the American "Guppy" type with a high enclosed fin conning tower. All are fitted with the Snort device. *Aurochs* is the only boat of this class not streamlined, and she is also the only British submarine in service still mounting a gun forward of the bridge. The modified boats now have only six 21-inch torpedo tubes, four bow and two stern, all internal, the original four external tubes and the 4-inch gun having been removed.

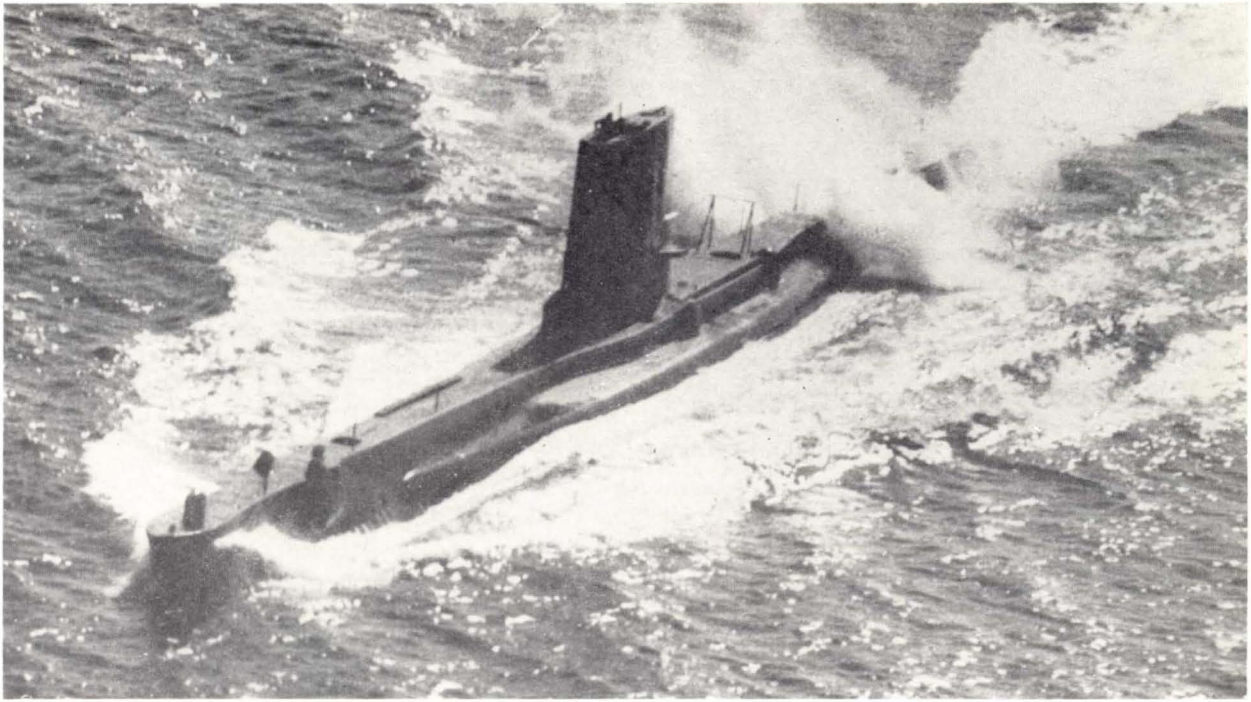
Surface displacement	*Submerged displacement*	*Length*	*Beam*	*Draught*
1,385 tons	1,620 tons	283 feet	22¼ feet	17 feet

Guns	*Forward torpedo tubes*	*After torpedo tubes*	*Complement*
1–4 inch (in *Aurochs* only)	4–21 inch (internal)	2–21 inch (internal)	60 to 68

Propelling machinery	*Shaft horse power*	*Surface Speed*	*Submerged Speed*	*Completed*
Diesels/electric motors	4,300/1,250	19 knots	8 knots	1945–1948

Note: Two experimental submarines, the *Excalibur* and *Explorer*, completed in 1956–8, are unarmed. The main propelling machinery consists of turbines supplied with steam and carbon dioxide produced by burning diesel fuel in an atmosphere of steam and oxygen formed by the decomposition of high-test peroxide. Conventional means of propulsion is provided by diesels on the surface and main motors supplied by batteries when submerged. *Explorer* is being scrapped.

Of the four midget submarines completed in 1954–5, the *Stickleback* was sold to Sweden in 1958 and renamed *Spiggen*, and the *Minnow*, *Shrimp* and *Sprat* are laid up.



ASTUTE

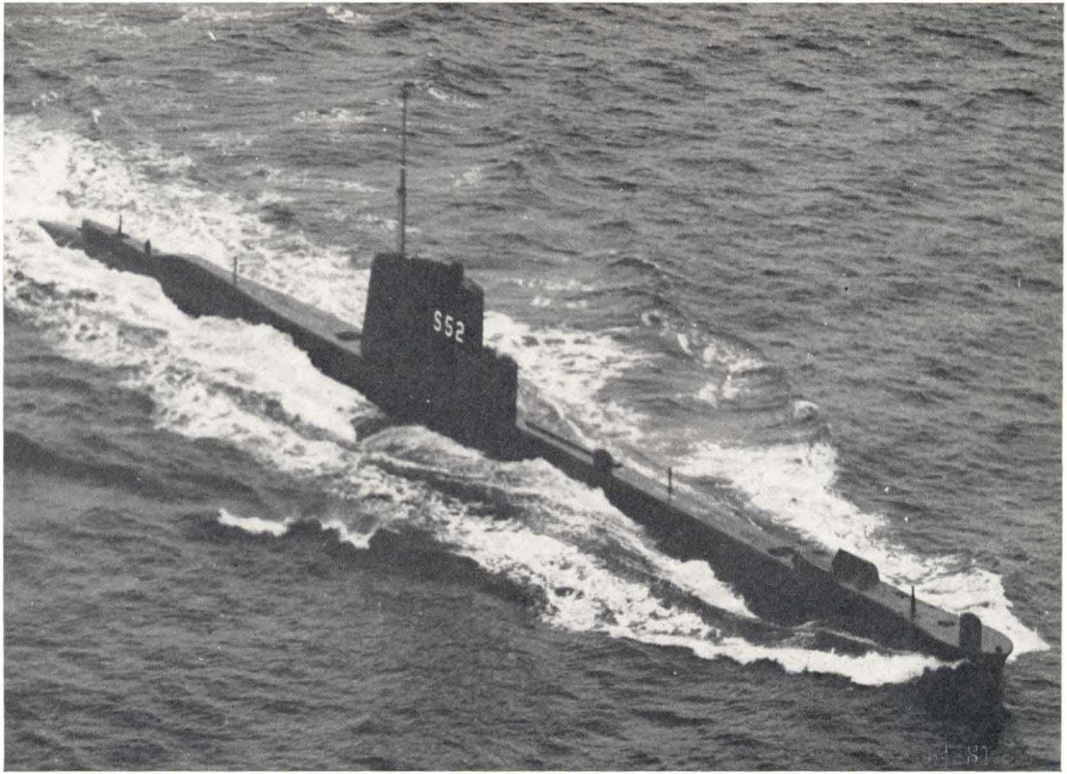
TABARD	**TEREDO**	**TIRELESS**	**TRUMP**
TACITURN	**THERMOPYLAE**	**TOKEN**	**TRUNCHEON**
TALENT	**TIPTOE**	**TOTEM**	**TURPIN**

Rebuilding of the eight boats of the "conversion" type, *Tabard*, *Taciturn*, *Thermopylae*, *Tiptoe*, *Totem*, *Trump*, *Truncheon* and *Turpin* in 1951–56 was drastic. The pressure hull was severed at the engine room section, the two halves moved apart and a new section built in. The extra space accommodates a second pair of electric motors, clutches between which and the original motors make diesel-electric drive possible, and a fourth battery section was added to give a submerged speed of 15 knots. All guns and external torpedo tubes were removed. Alteration of the five boats of the "modernised" type, *Talent*, *Tapir*, *Teredo*, *Tireless* and *Token* was less radical. They were streamlined with the formerly prominent periscope standards and aerials enclosed in a conning tower "fin" or "sail" which also contains the bridge. Of the "T" class, the *Tally Ho.*, *Taurus*, *Telemachus*, *Thorough* and *Tradewind* were scrapped in 1956–60, and *Tactician*, *Thule*, *Trenchant*, *Trespasser* and *Tudor* were scheduled for disposal in 1961–62, and *Tapir* at the end of 1963.

	Surface displacement	*Submerged displacement*	*Length*	*Beam*	*Draught*
"Conversion":	1,505 to 1,535 tons	1,700 to 1,740 tons	285½ to 293½ feet	26½ feet	14¾ feet
"Modernised":	1,321 tons	1,571 tons	273½ feet	26½ feet	14¾ feet
	Forward torpedo tubes	*After torpedo tubes*	*Complement*		*Completed*
"Conversion":	4–21 inch (internal)	2–21 inch (internal)	65		1944–1946
"Modernised":	4–21 inch (internal)	2–21 inch (internal)	59		
	Propelling machinery	*Shaft horse power*	*Surface speed*		*Submerged speed*
"Conversion":	Diesels/electric motors	2,500/2,900	15.25 knots		15 to 18 knots
"Modernised":	Diesels/electric motors	2,500/1,450	15 knots		9 to 12 knots

Note: Of the "S" class, the *Sidon* sank after a torpedo explosion at Portland in 1955 (she was salved, but sunk as a seabed target in 1957), *Selene*, *Scythian*, *Seneschal*, *Sleuth*, *Sturdy* and *Subtle* were scrapped in 1957–60, and *Sirdar* was expended in experiments at Rosyth. *Sanguine* and *Springer* were sold to Israel in 1958. *Scorcher*, *Scotsman*, *Sea Devil*, *Sea Scout*, *Sentinel*, *Seraph* and *Solent* were scheduled for disposal in 1961–63.

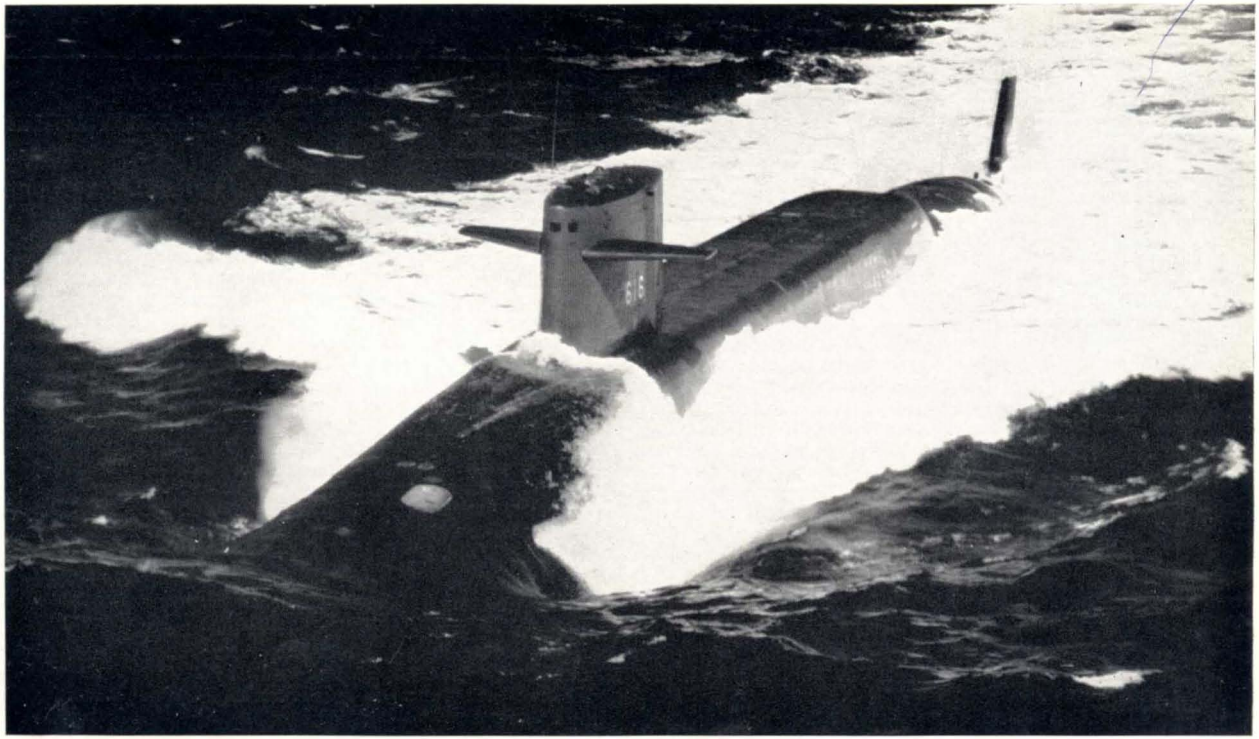
TOTEM



ALEXANDER HAMILTON	**HENRY CLAY**	**LAFAYETTE**	**TECUMSEH**
ANDREW JACKSON	**JAMES MADISON**	**NATHAN HALE**	**ULYSSES S. GRANT**
BENJAMIN FRANKLIN	**JAMES MONROE**	**NATHANAEL GREENE**	**VON STEUBEN**
CASIMIR PULASKI	**JOHN ADAMS**	**SAM RAYBURN**	**WOODROW**
DANIEL BOONE	**JOHN C. CALHOUN**	**SIMON BOLIVAR**	**WILSON**
DANIEL WEBSTER	**KAMEHAMEHA**	**STONEWALL JACKSON**	

The U.S.S. *Lafayette* is the prototype and name-ship of a new class of very large nuclear powered fleet ballistic missile submarines running into 22 units named to date with another nine projected. Launched in 8 May, 1962, before going down the ways into the Thames River she was christened by Mrs. John F. Kennedy, wife of the President of the United States, as befitted the heaviest submarine ever built and the first designed to fire the new "A-3" model "Polaris" fleet ballistic missile with a range of 2,875 miles. Built by the Electric Boat Division of the General Dynamics Corporation, Groton, Connecticut, the *Lafayette* is as big as a cruiser and much more complex. Her sixteen guided missile tubes are arranged for launching in double vertical rows of eight, forming a compact group amidships along the after deck just abaft the "sail", as the conning tower fin is called in the United States Navy. Her main propelling machinery is designed for a very high speed on the surface and submerged. The operational and technical equipment on board is most elaborate, and as she is the largest undersea craft ever built her internal organisation and standard of accommodation for her crew of officers and men is of such a high calibre as to be almost incredible in a submarine where space is always at a premium. The United States Navy and the shipyards are making great efforts to get this class of giant submarines into operational service as soon as possible. Several sister ships have been launched, most of the class have been laid down and the average building time for these large and complicated vessels looks like turning out at little more than two years, a very creditable achievement. *Alexander Hamilton*, *Benjamin Franklin*, *Casimir Pulaski*, *Daniel Webster*, *Lafayette*, *Nathan Hale*, *Tecumseh* and *Ulysses S. Grant* were built by the Electric Boat Division; *Henry Clay*, *James Madison*, *James Monroe*, *John Calhoun*, *Sam Rayburn*, *Simon Bolivar* and *Von Steuben* by the Newport News Shipbuilding and Dry Dock Company; *Andrew Jackson*, *Daniel Boone*, *Kamehameha*, *Stonewall Jackson* and *Woodrow Wilson* by Mare Island Naval Shipyard; and *John Adams* and *Nathanael Greene* by Portsmouth Naval Shipyard. *Lafayette* was commissioned on 23 April, 1963

Surface displacement	*Submerged displacement*	*Length*	*Beam*	*Draught*
7,000 tons	8,200 tons	425 feet	35 feet	30 feet
Guided weapons	*Torpedo tubes*	*Propelling machinery*	*Nuclear reactors*	*Complement*
16 "A-3" model "Polaris" fleet ballistic missiles	4–21 inch	Geared steam turbines Diesel generators Electric motors	1 pressurised water cooled	100



P

LAFAYETTE

ETHAN ALLEN THOMAS A. EDISON ABRAHAM LINCOLN ROBERT E. LEE
JOHN MARSHALL THOMAS JEFFERSON GEORGE WASHINGTON THEODORE ROOSEVELT
SAM HOUSTON PATRICK HENRY

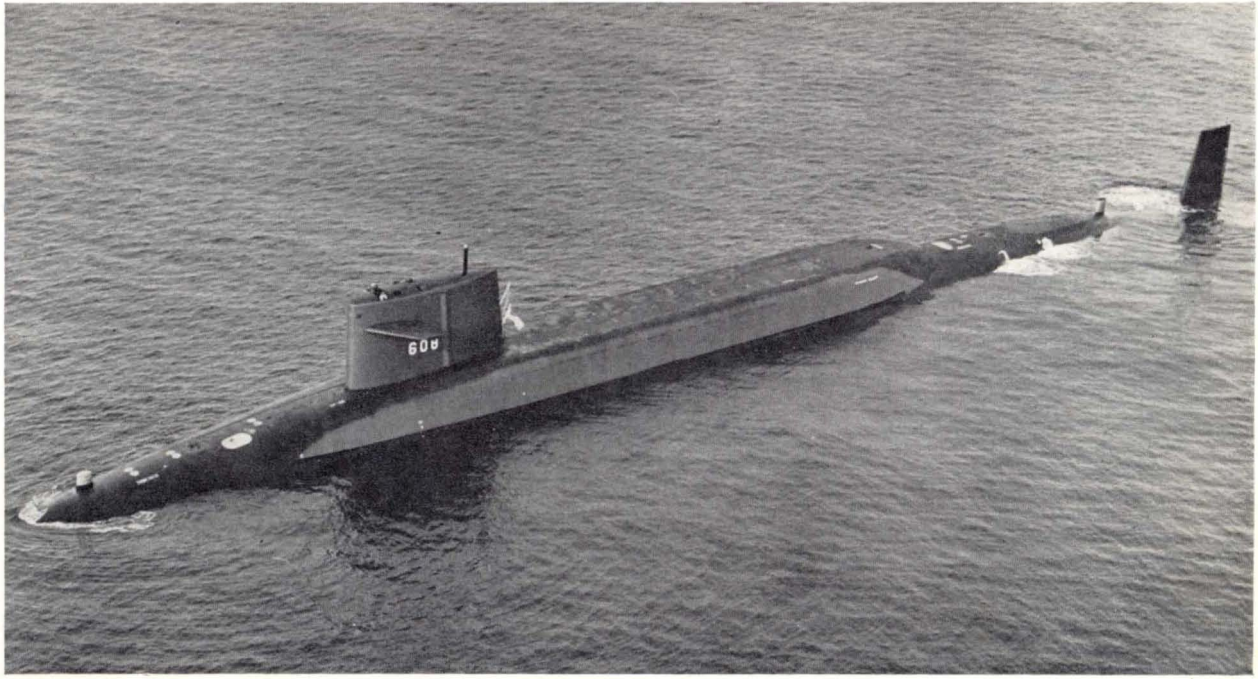
Ethan Allen was the lead ship in a new class of five nuclear powered fleet ballistic missile submarines, larger than the first five "Polaris" armed nuclear powered submarines of the "George Washington" class, with a new hull design. She and her sisters are of a larger and much improved type over the first group, one big difference being that the hull was specially designed to accommodate the guided missiles, whereas the hulls of the first five were adapted from previous hull designs. Their deterrent weapons are also more far-reaching, for their "Polaris" missiles are of the later "A-2" model with a range of 1,725 miles compared with the 1,380 miles of the "A-1 model in the "George Washington" class.

George Washington was the world prototype of ballistic missile armed nuclear powered submarines, and with her was initiated a new system of nomenclature, for she and her sisters, consistent with their status as deterrent vehicles and their role as the first real underwater cruisers, were named after presidents, generals and other prominent men in United States history, a departure from the traditional American procedure of naming all submarines after fishes or marine creatures. They have whale-shaped hulls. In addition to the steam-raising reactor and geared turbines each ship has an auxiliary diesel engine and electric batteries, both of which can be used for emergency propulsion.

Ethan Allen, George Washington, Patrick Henry and *Thomas A. Edison* were built by the Electric Boat Division of the General Dynamics Corporation, Groton, Connecticut; *John Marshall, Robert E. Lee, Sam Houston* and *Thomas Jefferson* by the Newport News Shipbuilding and Dry Dock Company, Newport News, Virginia; *Theodore Roosevelt* by Mare Island Naval Shipyard, California; and *Abraham Lincoln* by Portsmouth Naval Shipyard, New Hampshire. All were laid down between 1 Nov. 1957 and 3 Feb. 1961 and completed between 15 Nov. 1959 and 4 Jan. 1963, the average building time being about two years.

Surface displacement	*Submerged displacement*	*Length*	*Beam*	*Draught*	*Complement*
6,900 tons (*Ethan Allen*)	8,000 tons	410 feet	34 feet	29 feet	100
65,600 tons (*George Washington*)	6,700 tons	383 feet	33 feet	29 feet	112

Guided weapons	*Torpedo tubes*	*Propelling machinery*	*Nuclear reactors*	*Speed*
16 "A–2" model "Polaris" (*E.A.*)	4–21 inch	Geared steam turbines	1 pressurised	30
16 "A–1" model "Polaris" (*G.W.*)		Diesel generators	water cooled	knots
fleet ballistic missiles		Electric motors		



ETHAN ALLEN

BARB	**GATO**	**HADDO**	**PERMIT**	**STURGEON**
DACE	**GRAYLING**	**HADDOCK**	**PLUNGER**	**TAUTOG**
FLASHER	**GREENLING**	**JACK**	**POLLACK**	**TINOSA**
	GUARDFISH			**WHALE**

Thresher was the prototype of a new class of 25 nuclear powered attack submarines. They are of improved design with "tear-drop" hull configuration, and diving planes attached to the "sail" or conning tower fin, instead of the bow, to improve manoeuvrability. Their torpedo tubes are set in both sides of the hull amidships instead of in the bow. They are capable of diving deeper and running more quietly at high speeds than earlier United States submarines. Diving and steering operations are controlled automatically through push buttons. Their anti-submarine weapons comprise SUBROC (submarine rocket) combination torpedo and ballistic missile. This weapon is fired from a conventional 21 inch torpedo tube after which it streaks for the surface, leaves the water in a ballistic trajectory and then re-enters several miles from the launching submarine. Back in the water SUBROC becomes a submarine-hunting torpedo. Either a high explosive or nuclear warhead can be fitted. This rocket was designed to give the new "Thresher" class submarines a potent weapon to make the maximum use of their long-range sonar. The main propelling machinery comprises a pressurised water cooled nuclear reactor and one set of geared turbines turning one shaft to give a speed of 20 knots on the surface and 35 knots submerged. Of the 18 units named to date, *Flasher*, *Greenling*, *Gato* and *Sturgeon* were built by the Electric Boat Division of the General Dynamics Corporation, Groton, Connecticut; *Barb*, *Dace*, *Haddock* and *Tautog* by Ingalls Shipbuilding Corporation, Pascagoula, Mississippi; *Permit* and *Plunger* by Mare Island Naval Shipyard, California; *Pollack*, *Haddo* and *Guardfish* by the New York Shipbuilding Corporation, Camden, New Jersey; *Grayling*, *Jack*, *Thresher* and *Tinosa* by Portsmouth Naval Shipyard, New Hampshire; and *Whale* by the Bethlehem Steel Company, Quincy, Massachusetts. The first and name-ship of the class, *Thresher* was laid down on 28 May, 1958, launched on 9 July, 1960, and commissioned on 3 August, 1961. She was lost on 10 April, 1963. The second was completed on 6 June, 1962. Several sister ships have been launched to date and most of the class have been laid down.

Surface displacement	*Submerged displacement*	*Length*	*Beam*	*Draught*	*Complement*
3,750 tons	4,300 tons	279 feet	32 feet	29 feet	94

Anti-submarine weapons	*Torpedo tubes*	*Propelling machinery*	*Nuclear reactors*	*Speed*
SUBROC (submarine rocket) combination torpedo and ballistic missile	4–21 inch	Geared steam turbines Diesel generators Electric motors	1 pressurised water cooled	20 knots *surface* 35 knots *submerged*

THRESHER

HALIBUT **TULLIBEE** **TRITON**

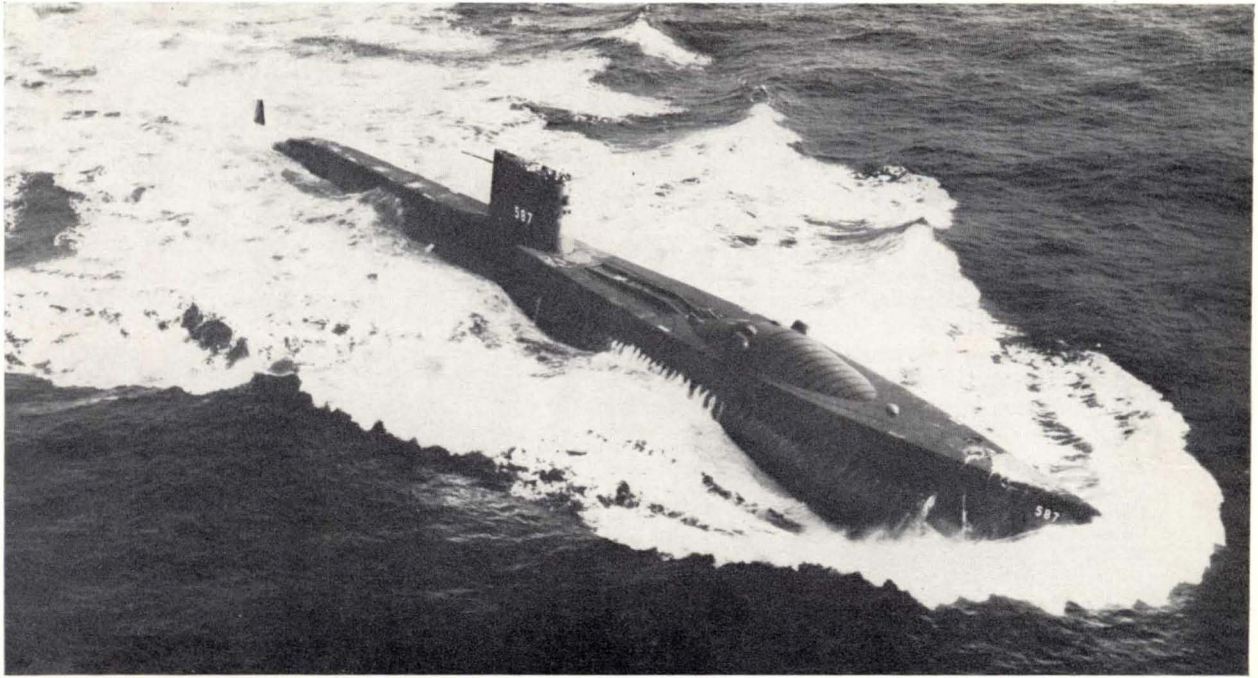
Halibut was the United States Navy's first guided missile nuclear-powered submarine, and the first ever designed from the keel up as a guided-missile carrier. Her hull was designed primarily to provide a stable launching platform rather than for speed or manoeuvrability. Built by Mare Island Naval Shipyard, California, she was laid down on 11 April 1957, launched on 9 January 1959 and commissioned on 4 January 1960. She was designed to handle "Regulus I" guided missiles.

Tullibee was the first nuclear-powered submarine designed for anti-submarine warfare. This "hunter-killer" was described as the closest to a true submersible and her speed is secondary to manoeuvrability. She is equipped with the latest scientific sonar tracking apparatus and unique sound-proofing. The placing of the torpedo tubes amidships allows for an unprecedented number of sonar tracking transducers and hydrophones in the bow area which provides "ears" for detecting enemy submarines. Built by the Electric Boat Division of the General Dynamics Corporation, she was laid down on 26 May 1958, launched on 27 April 1960 and commissioned on 9 November 1960.

Triton was the United States' first nuclear-powered radar picket submarine, the largest submarine ever built, and the first to be powered with two reactors. She was designed to serve as an early warning station and to keep up with the fastest aircraft carriers and destroyers. Built by the Electric Boat Division of the General Dynamics Corporation, she was laid down on 21 May 1956 launched on 19 August 1958 and commissioned on 10 November 1959. In March 1961 she was reclassified from SSRN (radar picket) to SSN (attack) status.

	Surface displacement	*Submerged displacement*	*Length*	*Beam*	*Draught*	*Complement*
Halibut:	3,655 tons	5,000 tons	350 feet	29 feet	29 feet	90
Tullibee:	2,175 tons	2,600 tons	261 feet	29 feet	20 feet	56
Triton:	5,900 tons	7,750 tons	447 feet	37 feet	25 feet	148

	Torpedo tubes	*Guided weapons*	*Propelling machinery*	*Nuclear reactors*	*Speed*
Halibut:	4–21 inch	"Regulus I"	Geared steam turbines	1 water cooled	18/25
Tullibee:	4–21 inch		Geared steam turbines	1 water cooled	20/25
Triton:	6–21 inch		Geared steam turbines	2 water cooled	30/30



HALIBUT

SCAMP **SCULPIN** **SKIPJACK** **SARGO** **SKATE** **SEAWOLF**
SCORPION **SHARK** **SNOOK** **SEADRAGON** **SWORDFISH** **NAUTILUS**

The characteristics of the prototype *Skipjack* are a shark-shaped hull, single screw propulsion, and hydrowings or diving planes fitting to the conning tower "fin" or "the sail", as the conning tower is now called on nuclear-powered submarines, instead of being encumbered by bow hydroplanes. *Scamp*, *Scorpion*, *Sculpin*, *Shark* and *Snook* are the successors of *Skipjack* with improved "tear-drop" hull design and configuration.

Sargo, *Seadragon* and *Swordfish* are sister ships of *Skate*, the first nuclear-powered submarine designed for quantity production, and which completed the second submerged crossing of the North Pole on 8 August 1958 after having held the (then) record of thirty-two days submerged.

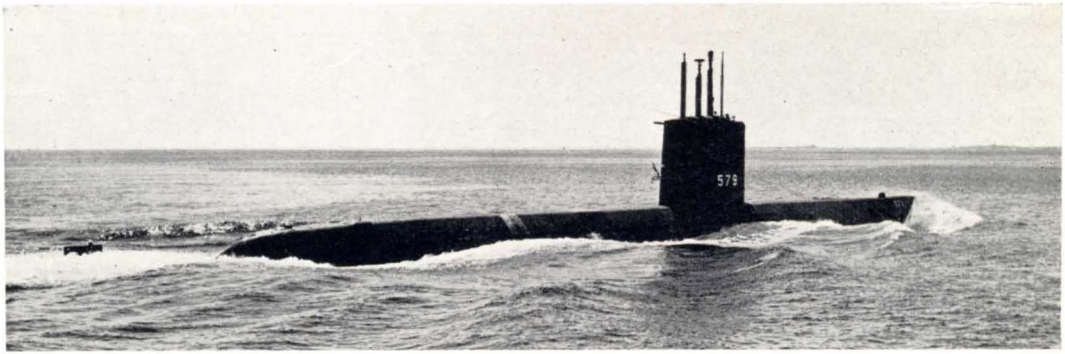
Seawolf is a developmental nuclear-powered submarine which broke the record when she remained submerged for sixty days in the Atlantic from 6 August to 6 October 1958.

Nautilus, the world's first nuclear-powered ship, made history when she got under way on 17 January 1955, and again when she made the first submerged crossing of the North Pole on 3 August 1958. She travelled 62,559 miles on the original core of enriched uranium.

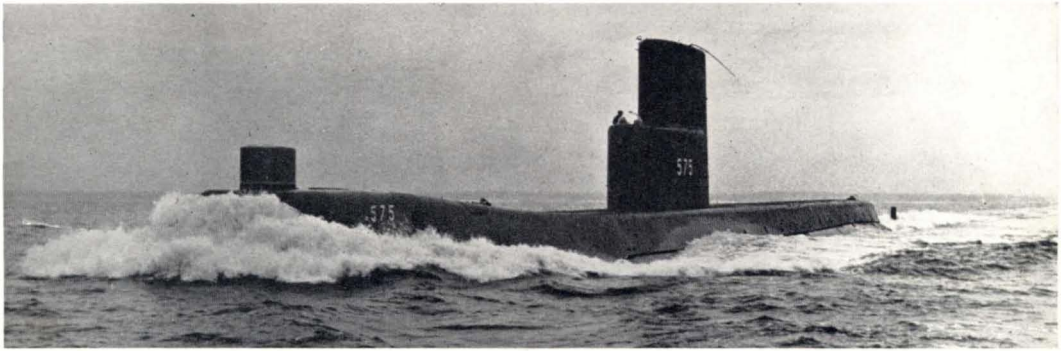
	Surface displacement	*Submerged displacement*	*Length*	*Beam*	*Draught*	*Complement*
'Skipjack" class:	2,830 tons	3,500 tons	252 feet	32 feet	28 feet	83
"Skate" class:	2,380 tons	2,860 tons	268 feet	25 feet	20 feet	83
Seawolf:	3,260 tons	4,110 tons	330 feet	30 feet	22 feet	102
Nautilus:	3,180 tons	3,747 tons	320 feet	28 feet	22 feet	101

	Torpedo tubes	*Propelling machinery*	*Nuclear reactors*	*Speed*	*Completed*
"Skipjack" class:	6–21 inch	Geared steam turbines	1 water cooled	20/30	1959–1961
"Skate" class:	6–21 inch	Geared steam turbines	1 water cooled	20/30	1958–1959
Seawolf:	6–21 inch	Geared steam turbines	1 water cooled	19/25	1957
Nautilus:	6–21 inch	Geared steam turbines	1 water cooled	20/27	1955

SWORDFISH



SEAWOLF



BARBEL **GRAYBACK** **DARTER** **SAILFISH** **ALBACORE**
BLUEBACK **GROWLER** **SALMON**
BONEFISH

Barbel, *Blueback* and *Bonefish* are the last conventionally powered operational submarines to be built by the United States, but while they have orthodox diesel propulsion they have the "Albacore" type hull configuration and greater underwater attack capabilities. They were completed in 1959.

Grayback and *Growler*, although originally designed as attack submarines and conventionally engined with diesels, were completed in 1958 as guided-missile submarines to handle "Regulus" weapons from twin-cylinder-shaped hangars faired into the upper forward hull. *Grayback* is the U.S. Navy's first submarine built expressly with guided-missile capability, other submarines having been converted and not built as such.

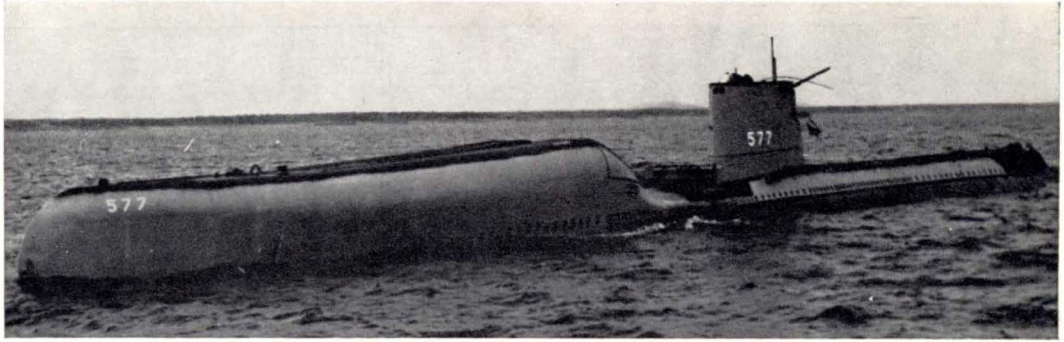
Darter, a high speed attack submarine designed for significantly higher underwater speed, and completed in 1956, is operated from a central console adjacent to the sound-proof diesel engine-room, and is officially described as "the quietest submarine of all time".

Sailfish and *Salmon* were radar picket submarines completed in 1956 and fitted with an air control centre, but in March 1961 they were reclassified as attack submiarines.

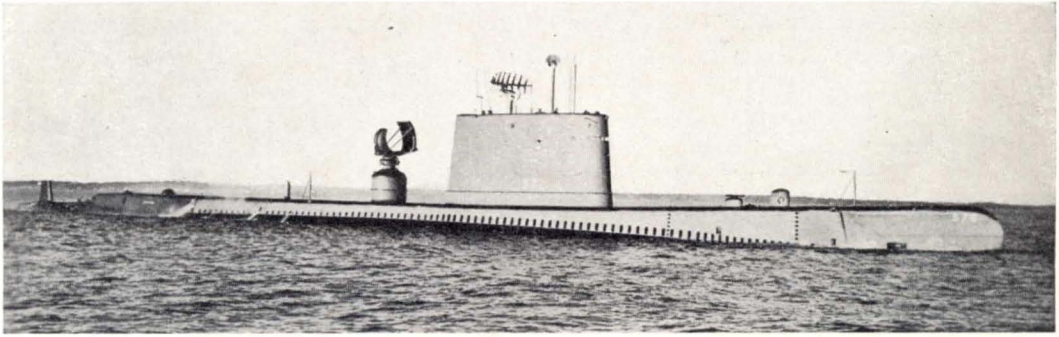
Albacore is a high-speed underwater target submarine, experimental vessel and hydrodynamic test vehicle, completed in 1953. She is conventionally powered, but of radical design with a new hull form which makes her faster and more manoeuvrable than any previous conventional submarine. She is streamlined and whale-shaped without the naval flat-topped deck, the conning tower being modelled on the dorsal fin of a fish.

Class	*Displacement*	*Length*	*Beam*	*Draught*	*Propelling machinery*	*Speed*
"BARBEL"	1,750/2,637 tons	219 feet	29 feet	19 feet	F.M. diesels/Electric motors	15/25 knots
"GRAYBACK"	2,287/3,638 tons	322 feet	30 feet	17 feet	F.M. diesels/Electric motors	20/18 knots
"DARTER"	1,720/2,388 tons	269 feet	27 feet	17 feet	F.M. diesels/Electric motors	17/25 knots
"SAILFISH"	2,425/3,168 tons	350 feet	29 feet	16 feet	F.M. diesels/Electric motors	20½/10 knots
"ALBACORE"	1,218/1,847 tons	204 feet	27 feet	18 feet	G.M. diesels/Electric motors	25/20 knots

GROWLER



SAILFISH



GUDGEON	**AMBERJACK**	**GRAMPUS**	**POMODON**	**SEA LEOPARD**	**TIRANTE**
HARDER	**ARGONAUT**	**GRENADIER**	**QUILLBACK**	**SIRAGO**	**TORSK**
TANG	**CONGER**	**IREX**	**REMORA**	**SPINAX**	**TRUMPETFISH**
TRIGGER	**CORSAIR**	**MEDREGAL**	**REQUIN**	**TENCH**	**TRUTTA**
TROUT	**CUTLASS**	**ODAX**	**RUNNER**	**THORNBACK**	**TUSK**
WAHOO	**DIABLO**	**PICKEREL**	**SARDA**	**TIGRONE**	**VOLADOR**

The first six ships named are post-war high-speed attack submarines, the latter ships are of war-time construction. A number of the earlier ships were converted, with extra batteries, into "Guppy" type. This name is an Americanism from the initials GUPP (Greater Underwater Propulsive Power), and implies a streamlined submarine, with external fittings faired into the hull or conning tower. The "Tench" class were all completed between July 1944 and September 1946. The "Tang" class were completed from October 1951 to November 1952. Of the "Tench" class, *Requin*, *Tigrone* and *Spinax* were converted into radar picket submarines; *Unicorn* and *Walrus*, the construction of which was suspended after the Second World War, were scrapped in 1959; and *Toro* was sunk off Cape Cod on 15 May 1963 as a sonar target in an attempt to find the lost *Thresher*.

Surface displacement	*Submerged displacement*	*Length*	*Beam*	*Draught*
("Tang" class) 1,800 tons	2,400 tons	278 feet	27½ feet	17 feet
("Tench" class) 1,800 tons	2,500 tons	311¾ feet	27¾ feet	17 feet

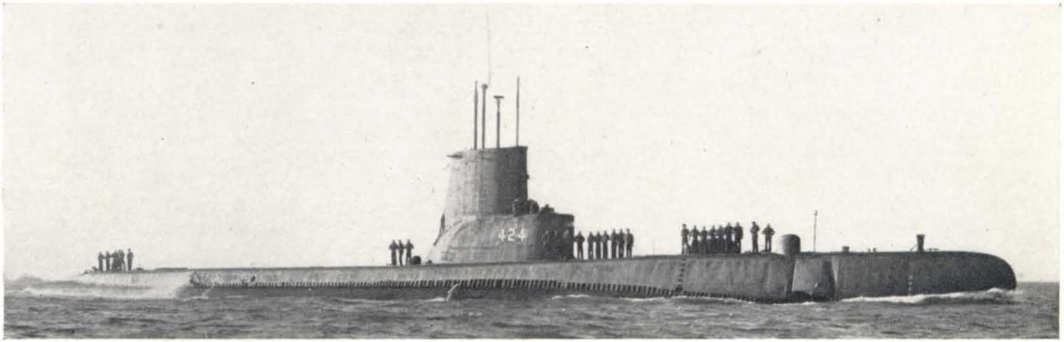
Main guns	*Anti-aircraft guns*	*Torpedo tubes*	*Complement*
("Tang" & "Guppy" classes) nil	nil	8–21 inch	78 to 83
("Tench" class) 1–5 inch	2–40 mm.	10–21 inch	78 to 85

Propelling machinery	*Shaft horse power*	*Surface speed*	*Submerged speed*
("Tang") Diesel/electric motors	4,200/3,200	15 to 20 knots	18 knots
("Tench") Diesel/electric motors	6,500/4,610	20 knots	10 to 15 knots

Note: There are also the hunter-killer submarines *Barracuda*, *Bass* and *Bonita* of 765/1,160 tons, completed in 1951–52; and the target and training submarines *Mackerel* and *Marlin* of 303/347 tons, completed in 1953.

TRIGGER

QUILLBACK



ARCHERFISH	**BUGARA**	**CREVALLE**	**LING**	**PLAICE**	**SEAFOX**
ASPRO	**CABEZON**	**CUBERA**	**LIONFISH**	**POMFRET**	**SEAHORSE**
ATULE	**CABRILLA**	**CUSK**	**LOGGERHEAD**	**QUEENFISH**	**SEA LION**
BALAO	**CAIMAN**	**DENTUDA**	**MANTA**	**RAZORBACK**	**SEA OWL**
BANG	**CAPITAINE**	**DEVILFISH**	**MENHADEN**	**REDFISH**	**SEA POACHER**
BARBERO	**CARBONERO**	**DIODON**	**MORAY**	**RONCADOR**	**SEA ROBIN**
BATFISH	**CARP**	**DOGFISH**	**PAMPANITO**	**RONQUIL**	**SEGUNDO**
BAYA	**CATFISH**	**ENTREMEDOR**	**PARCHE**	**SABALO**	**SENNET**
BECUNA	**CHARR**	**GREENFISH**	**PERCH**	**SABLEFISH**	**SPADEFISH**
BESUGO	**CHIVO**	**GUAVINA**	**PICADU**	**SANDLANCE**	**SPIKEFISH**
BILLFISH	**CHOPPER**	**HACKLEBACK**	**PINTADO**	**SCABBARDFISH**	**STERLET**
BLACKFIN	**CLAMAGORE**	**HALFBEAK**	**PIPEFISH**	**SEACAT**	**THREADFIN**
BLENNY	**COBBLER**	**HARDHEAD**	**PIPER**	**SEADEVIL**	**TIRU**
BOWFINN	**CORPORAL**	**JALLAO**	**PIRANHA**	**SEADOG**	**TREPANG**

The particulars given below are for the standard design, but twenty-nine units were converted into "Guppies", *Barbero* into a guided-missile submarine, *Baya* and *Manta* into experimental submarines, *Burrfish* into a radar picket submarine, *Guavina* into a submarine oiler, and *Perch* and *Sealion* into transport submarines. *Stickleback* was rammed and sank in 1958. *Lancetfish*, suspended after the Second World War, was scrapped in 1959. *Dragonet* was stricken in 1961 and expended as a target.

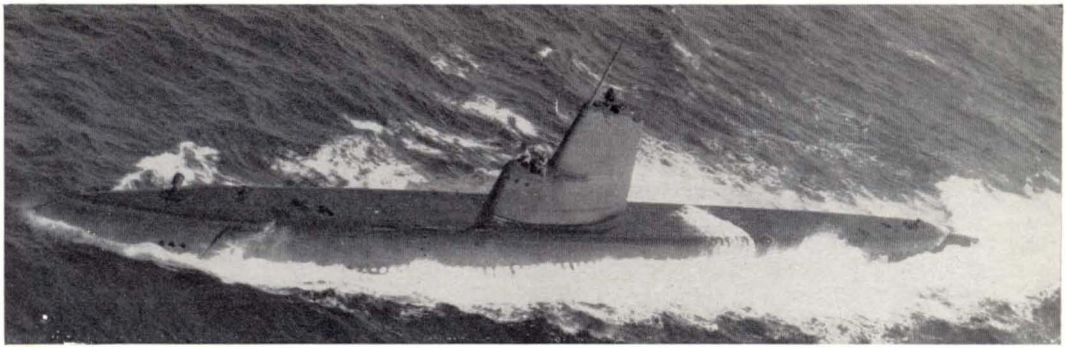
Surface displacement	*Submerged displacement*	*Length*	*Beam*	*Draught*
1,816 tons	2,425 tons	311½ feet	27 feet	17 feet
Main guns	*Anti-aircraft guns*	*Forward torpedo tubes*	*After torpedo tubes*	*Complement*
1 or 2–5 inch	2–40 mm.	6–21 inch	4–21 inch	78 to 85

Propelling machinery	*Shaft horse power*	*Surface speed*	*Submerged speed*
Diesels/electric motors	6,500/4,610	20 knots	10 knots ("Guppies" 17.25 knots)

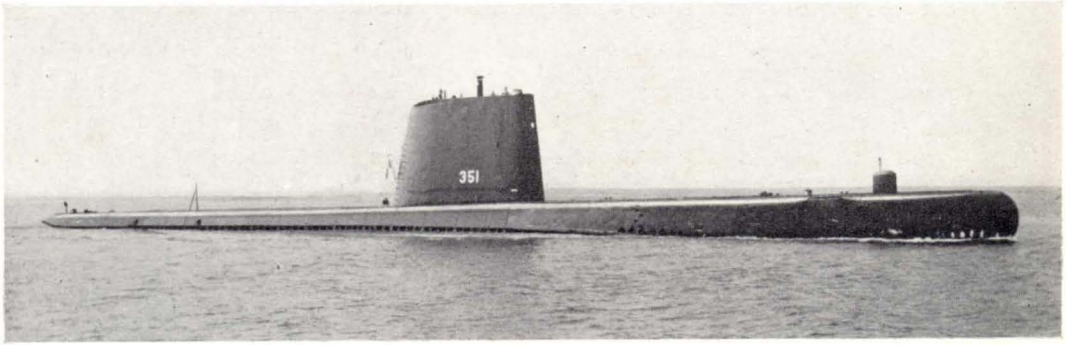
The following were transferred: *Tilefish* to Venezuela in 1960, *Lamprey* and *Macabi* to Argentina in 1960, *Springer* to Chile in 1961, *Burrfish* to Canada in 1961, *Spot* to Chile in 1962.

Of the very similar but earlier units of the "Gato" class the following survive as experimental, training or auxiliary submarines: *Angler*, *Bashaw*, *Bluegill*, *Bream*, *Cavalla*, *Cero*, *Cobra*, *Cod*, *Croaker*, *Drum*, *Grouper*, *Hake*, *Rasher*, *Raton*, *Redfin*, *Rock*, *Silversides* and *Tunny*.

CLAMAGORE



GREENFISH



6 "E" CLASS **21 "F" CLASS** **22 "G" CLASS** **9 "H" CLASS** **10 "N" CLASS**

The "E" class are a new type of nuclear powered fast ocean going submarines of streamlined design, fitted with six guided missiles in tubes which elevate out of the flush deck, with launchers two abreast.

The "F" class are large attack submarines of an improved "Z" type with greater length. They are equipped with snort breathing trunk for their conventional engines.

The "G" class are a new type of ballistic missile submarines having a very large conning tower fitted with three vertically mounted tubes and hatches for the launching of guided missiles reported to have a range of 350 miles. They have conventional diesel propulsion.

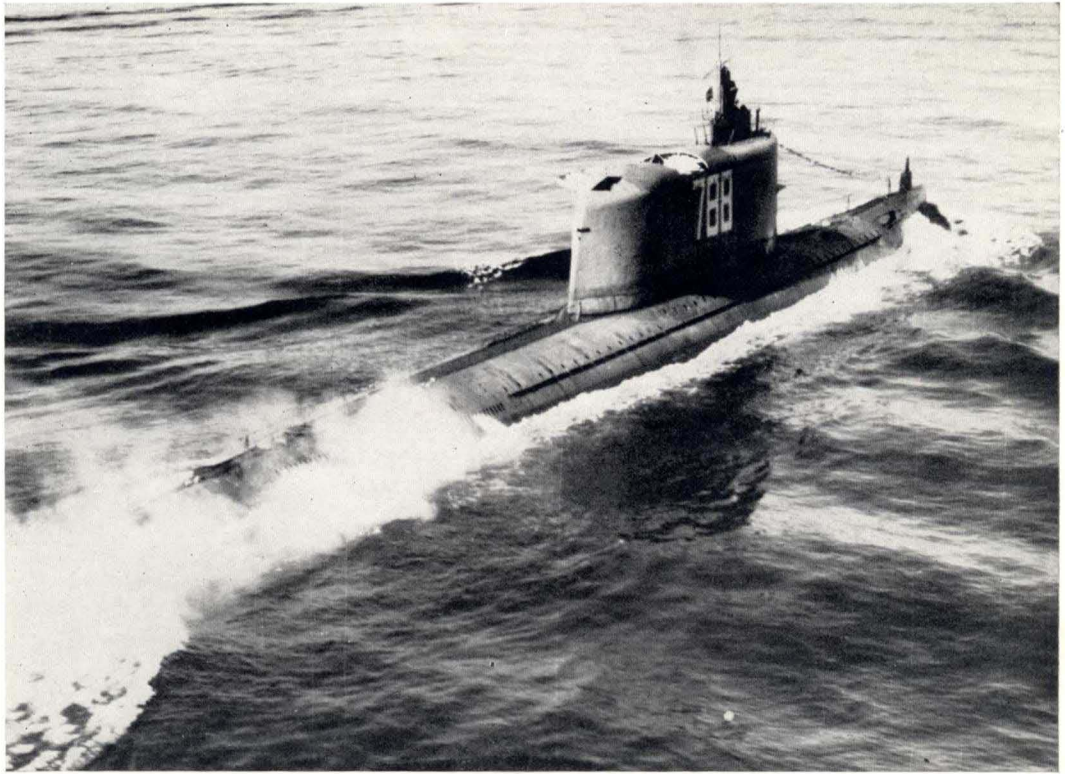
The "H" class are a new type of nuclear powered long range cruising submarines armed with ballistic missiles, and are bigger than the "E" class.

The "N" class are a new type of nuclear powered attack submarines designed as anti-submarine hunter-killers, but are reported to be basically similar, in main particulars to the "H" class.

Surface displacement	*Submerged displacement*	*Length*	*Beam*	*Draught*	*Complement*
"E" class, 3,000 tons	3,500 tons	300 feet	32 feet	25 feet	100
"F" class, 1,960 tons	2,280 tons	300 feet	26 feet	19 feet	75
"G" class, 2,350 tons	2,800 tons	320 feet	28 feet	22 feet	86
"H" class, 3,500 tons	4,000 tons	328 feet	33 feet	25 feet	110
"N" class, 3,000 tons	3,500 tons	300 feet	32 feet	20 feet	90

Guided weapons	*Torpedo tubes*	*Propelling machinery*	*Speed*
"E" class, 6 launching tubes		Geared steam turbines, nuclear reactors	25–30 knots
"F" class	8–21 inch	Diesel generators, electric motors	20 knots
"G" class, 3 launching tubes	10–21 inch	Diesel generators, electric motors	17–17.6 knots
"H" class. 6 launching tubes	6–21 inch	Geared steam turbines, nuclear reactors	25–30 knots
"N" class	6–21 inch	Geared steam turbines, nuclear reactors	25–30 knots

"G" CLASS



33 "Z" Class **236 "W" Class** **30 "Q" Class**

The "Z" class are of a large oceangoing type, built during 1952–8. Their general appearance is very streamlined with a complete row of rapid-flooding holes along the casing. These submarines are stationed in considerable numbers in the Baltic and Far East. Their mine capacity is alternative to torpedo capacity. All are equipped with a snort. Some were said to be nuclear powered, seven are equipped with ballistic missiles. Several are reported to be oilers.

The "W" class are a medium-sized type of long-range submarines, all streamlined and equipped with a snort, and fitted for mine-laying. A number are stationed in the Far East. Some units are reported to be equipped with a special tank or hangar on deck for carrying guided-missile launchers. Several carry a 3.9-inch deck gun.

The "Q" class were a new type of medium-range, single screw submarines, believed to be improved versions of the earlier "Shch" class nearly all of which have been discarded.

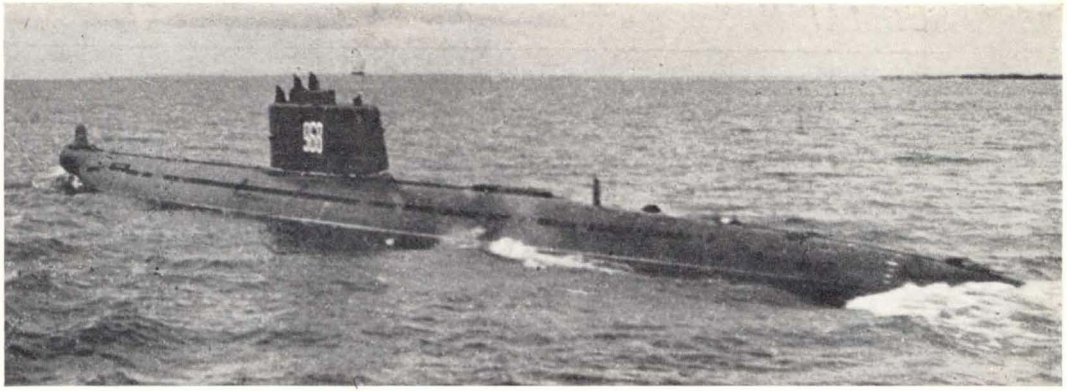
Surface displacement	*Submerged displacement*	*Length*	*Beam*	*Draught*
("Z" class) 2,100 tons	2,600 tons	295 feet	28 feet	19 feet
("W" class) 1,030 tons	1,180 tons	240 feet	22 feet	15 feet
("Q" class) 650 tons	740 tons	185 feet	18 feet	13 feet

Main guns	*Anti-aircraft guns*	*Torpedo tubes*	*Mines*	*Complement*
("Z" class) 2–57 mm.	2–25 mm.	8–21 inch	40	70
("W" class) 2–57 mm.	2–25 mm.	8–21 inch	40	60
("Q" class) 2–25 mm.	2–20 mm.	4–21 inch	10	40

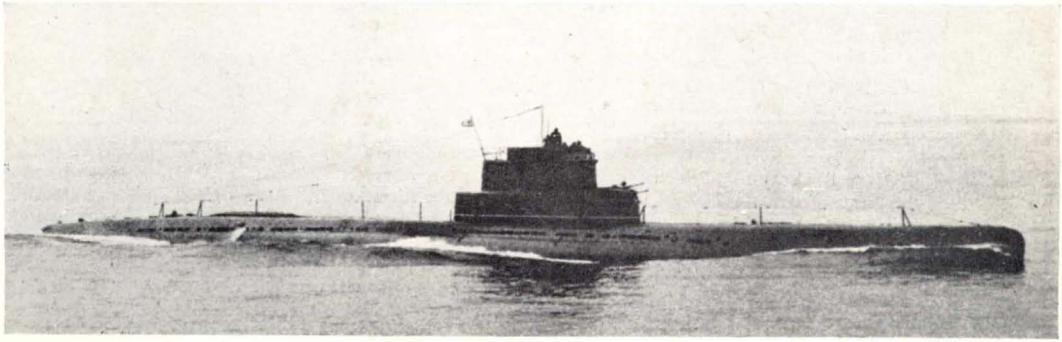
Propelling machinery	*Shaft horse power*	*Surface speed*	*Submerged speed*	*Completed*
("Z" class) Diesels/electric motors	10,000/3,500	20–22 knots	12–16 knots	1956–1962
("W" class) Diesels/electric motors	4,000/2,500	16–17 knots	13–16 knots	1954–1960
("Q" class) Diesels/electric motors	3,000/2,500	16–18 knots	15–16 knots	1954–1960

Note: There are also a number of older submarines including 13 of the ocean-going "K" class of 1,457/2,062 tons; 30 of the seagoing "S" class of 780/1,050 tons; and 53 of the coastal "M" classes of 350/420 and 205/256 tons; but they are now in varying degrees of obsolescence and of little further operational value (see full particulars in the 1960 Edition).

"Z" Class



"W" Class



DAUPHIN	**AMAZONE**	**DAPHNE**
ESPADON	**ARETHUSE**	**DIANE**
MARSOUIN	**ARGONAUTE**	**DORIS**
MORSE	**ARIANE**	**EURYDICE**
NARVAL		**FLORE**
REQUIN		**GALATEE**
		MINERVE

The "Narval" class, completed in 1957–1960, are improved versions of the German XXI type submarines. They were built in seven prefabricated sections each of ten metres in length. *Narval* was first completed without her present bulbous bow.

The "Arethuse" class are of a new hunter-killer type for destroying enemy submarines. They have a streamlined hull, silent motors, and up-to-date electronic and detection equipment. They were completed in 1958–1960.

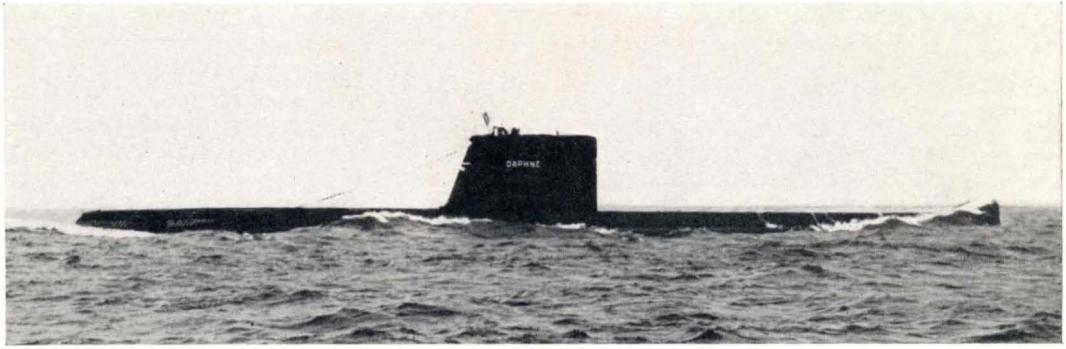
The "Daphne" class are intended as improved killer versions of the "Arethuse" class, and first reports indicate that they are most successful boats. They were launched from 1959 onwards. Two more units of this type are being built, Q 249 and Q 250.

Surface displacement	*Submerged displacement*	*Length*	*Beam*	*Draught*
("Narval" class) 1,640 tons	1,910 tons	256 feet	23⅜ feet	18 feet
("Arethuse" class) 529 tons	634 tons	164 feet	19 feet	12¾ feet
("Daphne" class) 850 tons	1,040 tons	190¼ feet	22¼ feet	15½ feet

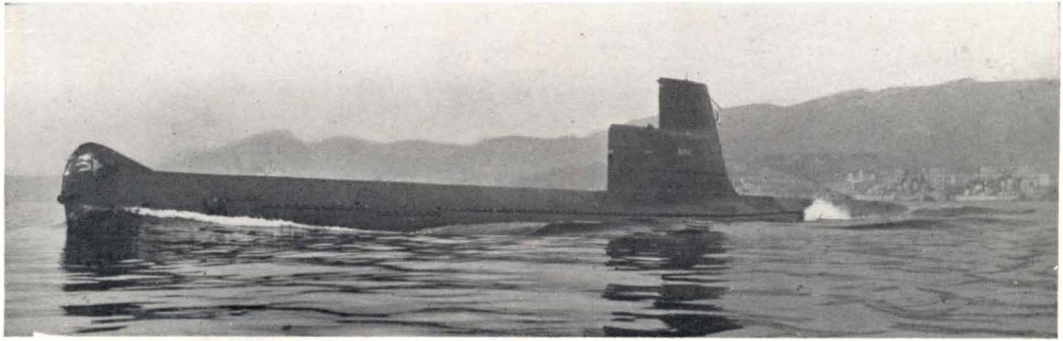
Torpedo tubes	*Propelling machinery*	*Shaft horse power*	*Speed*	*Complement*
("Narval" class) 8–21.7 inch	Diesels/electric motors	4,000/5,000	16/18 knots	58
("Arethuse" class) 4–21.7 inch	Diesels/electric motors	1,060/1,300	16/16 knots	39
("Daphne" class) 12–21.7 inch	Diesels/electric motors	2,120/3,000	16/16 knots	45

Note: A nuclear submarine, "Q 244" was projected; but her construction as such has been abandoned and instead "Q 251", a conventional submarine equipped with diesel-electric engines will be constructed from the unfinished hull for experiments on rocket-firing from underwater vessels and the results will be used in building a prototype nuclear powered submarine which France will have by 1969.

DAPHNE



NARVAL



L'ANDROMEDE **L'ARTEMIS** **L'ASTREE**

The only French-built submarines in service during the post-war years, until the completion of the "Narval" class, all these ships are of pre-war design. Of their two sister ships *L'Africaine* was withdrawn from active service in 1961, having expended her useful life; and *La Creole*, towed to Britain in an uncomplete state in 1940 and returned to her builders for completion in 1946, was officially stricken from the list in 1963. Supplementing these ships was a mixed force of British and German construction. Four ex-British "S" class, *Saphir*, *Sirene*, *Sultane* and *Sibylle* were loaned in 1951 and 1952 for anti-submarine training, but the *Sibylle* was lost with all hands in the Mediterranean in September 1952, and the other three were returned to Great Britain in 1958–1961. Five ex-German submarines (prizes) were acquired and put into effective use, namely *Blaison*, *Bouan*, *Laubie*, *Mille* and *Roland Morillot*, but *Blaison* was discarded in 1957, *Bouan* was scrapped in 1958, *Laubie* was seriously damaged by collision and scrapped in 1961, and *Mille* was withdrawn from service in 1962.

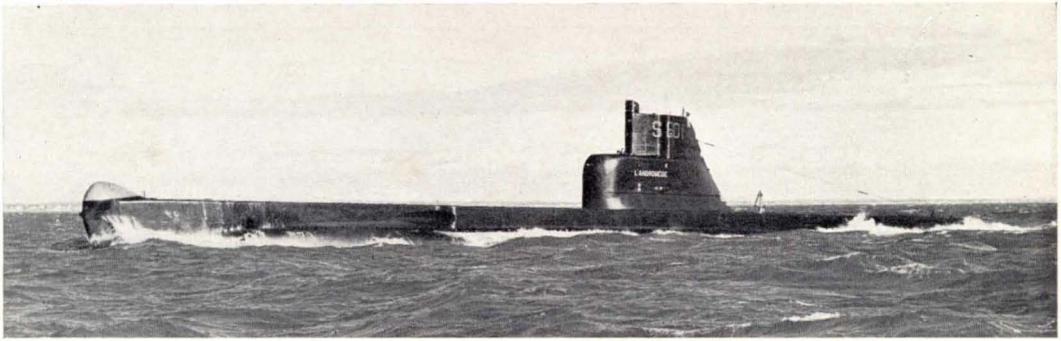
Surface displacement	*Submerged displacement*	*Length*	*Beam*	*Draught*
970 tons	1,250 tons	241 feet	21⅓ feet	13⅜ feet

Main guns	*Anti-aircraft guns*	*Torpedo tubes*	*Complement*
1–3.5 inch (or none)	2–20 mm. (or none)	10–21.7 inch (4 external)	62

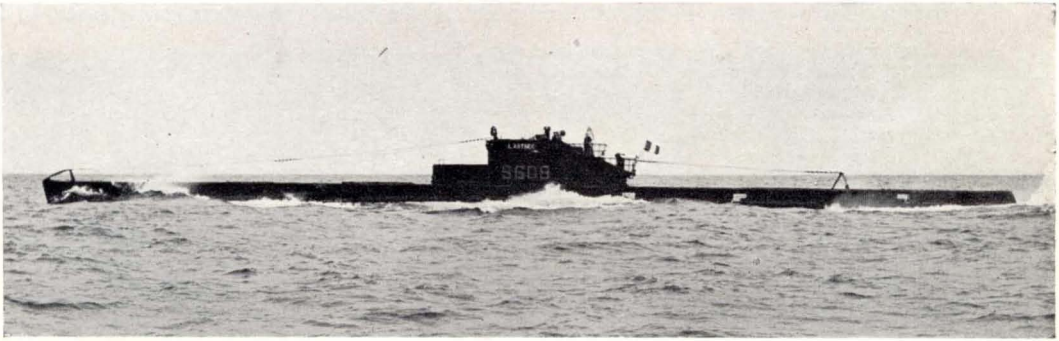
Propelling machines	*Shaft horse power*	*Surface speed*	*Submerged speed*
Diesels/electric motors	3,000/1,400 to 2,000	17.3 knots	10 to 14 knots

Name	*Begun*	*Launched*	*Completed*	*Builders*
L'ANDROMEDE	1945	17 Nov. 1949	1953	Dubigeon-Nantes
L'ARTEMIS	1945	28 July 1952	1953	Normand and Dubigeon
L'ASTREE	1945	4 May 1946	1949	Dubigeon-Nantes

L'ANDROMEDE



L'ASTREE



DELFINEN	**NORDKAPAREN**	**BAVERN**	**SALEN**	**NACKEN**	**SJOBORREN**
DRAKEN	**SPRINGAREN**	**HAJEN**	**UTTERN**	**NAJAD**	**SJOHASTEN**
GRIPEN	**VARGEN**	**ILLERN**	**VALEN**	**NEPTUN**	**SJOORMEN**
					TUMLAREN

The four surviving vessels of the "Sjo" class, completed in 1938–42, and the three vessels of the "Najad" class, completed in 1943, were all modernised and streamlined in 1953–55.

The six modern submarines of the "Hajen" class, completed in 1956–60, *Bavern*, *Hajen*, *Illern*, *Salen*, *Uttern* and *Valen*, are larger vessels, equipped with Schnorkel, and have fast-diving capabilities.

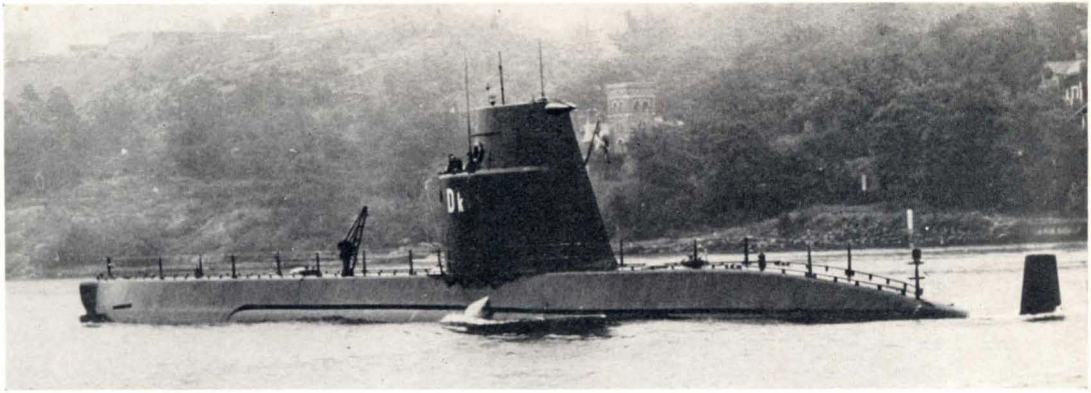
Six more new submarines, *Delfinen*, *Draken*, *Gripen*, *Nordkaparen*, *Springaren* and *Vargen* were completed in 1961–63; and a new class of ten submarines at present known as the "A 11" Type is planned.

There are six surviving coastal submarines, completed in 1943–44, namely *Aborren* (ex-U 5), *Makrillen* (ex-U 9), *Forellen* (ex-U 4), *Laxen* (ex-U 7), *Gaddan* (ex-U 7) and *Siken* (ex-U 6), all of relatively small size, having been designed for operations in the restricted waters of the Baltic. They were reconstructed in 1960–63.

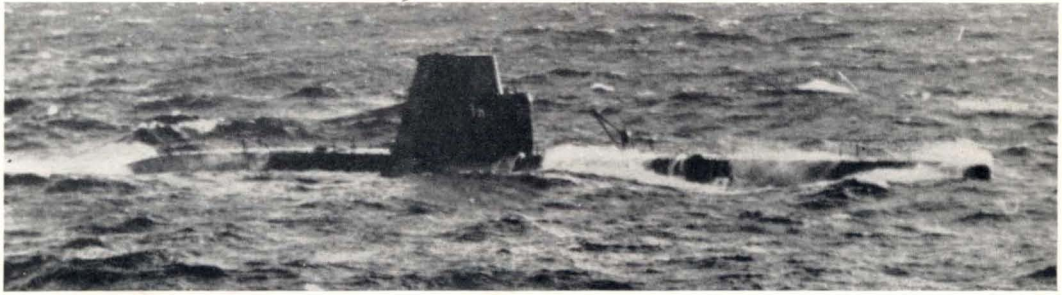
Surface displacement	*Submerged displacement*	*Length*	*Beam*	*Draught*
("Draken" class) 835 tons	1,000 tons	227½ feet	15¾ feet	14½ feet
("Hajen" class) 785 tons	990 tons	216½ feet	16¾ feet	19¾ feet
("Najad" class) 600 tons	720 tons	200 feet	20⅔ feet	11 feet
("Sjolejonet" class) 650 tons	760 tons	204 feet	20½ feet	11 feet
("U" class) 430 tons	460 tons	164 feet	17½ feet	17½ feet

Torpedo tubes	*Propelling machinery*	*Shaft horse power*	*Speed*	*Complement*
("Draken" class) 4–21 inch	Diesels/electric motors	1,700/1,700	16/16 knots	50
("Hajen" class) 4–21 inch	Diesels/electric motors	1,700/1,700	16/16 knots	44
("Najad' class) 4–21 inch	Diesels/electric motors	3,000/2,000	16/10 knots	32
("Sjolejonet" class) 6–21 inch	Diesels/electric motors	3,000/2,000	16/10 knots	32
("U" class) 4–21 inch	Diesels/electric motors	1,500/750	14/9 knots	23

DRAKEN



ILLERN



INDEX

INDEX

INDEX

INDEX

THE STEEL NAVY

A concise and comprehensive reference of the British Commonwealth Fleets from 1860 to 1962

JAMES DOLBY

The Steel Navy consists of more than two hundred silhouettes showing the fighting ships in side view, and a large number of pages are devoted to the names and details of displacement, speed and armament of the major combatant ships of more than 1,000 tons, built for the Royal Navy and Commonwealth Navies since 1890. The names of warships other than those mentioned appear in tabular form, and representative types of cruising vessels built during the period of transition from wood to steel construction are also listed.

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MACDONALD